March 1993 Issue #20

BULK RATE
U.S. POSTAGE
PAID
PERMIT #1
MANCHESTER, NH

Radio Fun

$2.00

"The beginner's guide to the exciting world of amateur radio."

in this issue

features

6 An Easy CAT Program for the Yaesu FT-747GX KC2NT
10 Handy-Dandy Coax Adapter Box W3RZD
11 Mobile Crossband Repeater VE6MST
14 Amateur Radio and the Art of Kidney Transplantation WB2MIC
15 Confessions of a Low Power Freak W4WFL
18 What Else Can You Hear on Your 2 Meter Rig? N1II

vintage reviews

13 The Kenwood TS-430S WA4BLC
26 The ICOM IC-751 HF Transceiver WB6TOV

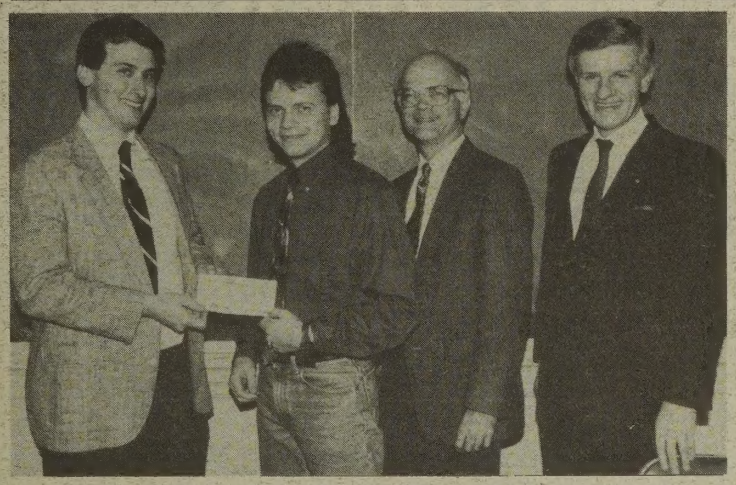
departments

30 Activities Calendar Staff
17 Ad Index Staff
22 Antennas, Etc. K4IPV
28 Flea Market Staff
5 Letters Staff
28 New Products Staff
4 QLF W2NSD/1
21 Radio Magic WB8VGE
12 The Tech Side KB1UM
29 Uncle Wayne's Bookshelf Staff
23 Upgrade . . . Don't Stop Now WB6NOA
24 What's Next? WB2MGP

Packet Radio Equipment Needed for Poland Center

Packet radio equipment is needed for "Community-Based Computer Centers" in Poland. The first center was opened recently with a network of five new computers, two printers, a fax/modem, and other peripherals, through the efforts of the American Council for Polish Culture (ACPC) and the support of the Institute for Community-Based Computing (ICBC) of New Durham, New Hampshire. The center, located in Siedlce, an economically depressed region of Poland, is opening up opportunities for young adults, including the disabled, to study and work with state-of-the-art computer equipment and key programs, particularly desktop publishing. While all of the equipment installed at the center has been donated or purchased through the ACPC and ICBC, the community itself is providing the space, utilities and manpower to operate and maintain the center. During 1993, the ACPC and ICBC plan to replicate the Siedlce center in three other communities in Poland.

The U.S. State Department has suggested that the center training opportunities and operations could be further enhanced by improved communications with other parts of the country through the introduction of packet operations. The ACPC, a 501(c)(3) nonprofit organization, is appealing for donations of packet radio components (radios, controllers, antennas, etc.), new or used, for the installation of one complete unit at the Siedlce Center and a unit in each of the three additional centers planned for 1993. Anyone interested in helping by donating equipment is requested to contact: Mr. Marion Winters, A CPC Computers for Poland Project Director, 953 Wellington Road, Rindge NH 03461; telephone (603) 899-6333.



Radio Club of America Virginia Tech scholarship award. Left to right: Ted Rappaport; William Newhall; Charles Bostian, professor of EE; William F. Stephenson, EE department head.

Radio Club Contributes $1,000 for Scholarship

The Radio Club of America sponsored the first Virginia Tech scholarship to an engineering student, William Newhall of Bridgewater, New Jersey. "We hope the $1,000 scholarship will become an annual event," said Ted Rappaport, associate professor of electrical engineering at Virginia Tech and director of its Mobile and Portable Radio Research Group.

Coast Guard Goes No-Code!

See page 3.

KARC Believes in Public Service

The Kimberling Amateur Radio Club goes the extra mile when it comes to public service. The club is unique in that so many members are retired and live in a retirement community. Kimberling City is a small town of only 1,350 people, nestled in the Ozark Mountains of southwest Missouri. It is a recreation area near Branson, Missouri, which is becoming well-known throughout the U.S. for its country music entertainment.

KARC was established in 1986 by eight charter members and now has a membership of 124, which includes a few nonvoting and five honorary members.

The club is involved in many activities which are not related to amateur radio. Members work with the Merchants Association, Thrift Shop, Senior Center, Christian Associated, local library, Army Corp. of Engineers, Health Care Center, Chamber of Commerce, Telephone Company, and Trees America. Sometimes they are called upon to take an ailing person to the doctor or hospital, pick up items for the thrift shop, repair some household appliance, paint the library, or set up tables and chairs for meetings. The list goes on and on. They do find time, however, to have their emergency vehicle at various shopping centers for message handling, telling people about amateur radio.

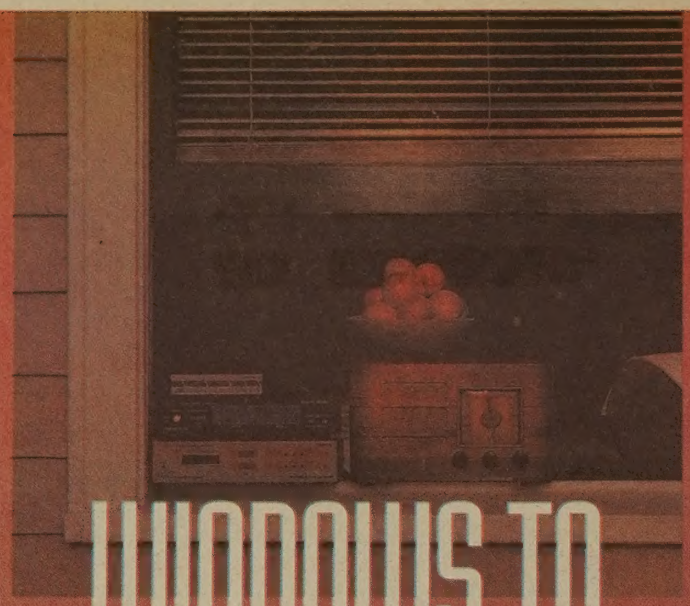
By getting involved in these many community activities the club has become well-known and accepted by the community as a whole. Members have been requested to speak to the Rotary Club, Realty Board, Shriner Club, Kimberling Club and Lions Club. They always work with the Boy Scout J.O.T.A. and have had three special events.

Their club room is furnished by the Kimberling Hills Country Club, free of charge. They meet there once each month and are provided with with a first-class dining room for a buffet breakfast, after which they have their monthly VE exams in the same room.

KARC's membership includes talent from many walks of life: teachers, computer specialists, IBM technicians. There are many willing hands ready to volunteer. They have a coordinator for all their problems and all requests come through him and are dealt with in an orderly manner.

Even with all this going on, there is still time for the real thing. In fact, all the public service activity seems to create more enthusiasm. They have plenty of volunteers. Their teachers are busy with classes for the beginners as well as for those wanting to upgrade. They have 16 accredited VEs on the exam team and generally have at least one special exam for a Novice or Technician candidate in addition to the once-a-month test session. The club is active in ARES and traffic handling. They publish a monthly club paper which they consider to be the glue that holds the club together.

KARC wishes to pass on some advice to any club having trouble with attendance or interest: Get involved.



WINDOWS TO THE WORLD.

Pakratt for Windows is the only data controller program for Microsoft© Windows™ on the market today. AEA gives you a true Windows application for controlling AEA's entire family of data controllers, including the new DSP-2232 and the new PK-900.

This graphics-oriented program offers all standard Windows 3.x features (cut-and-paste, custom window sizing and color selection, etc.) and can run minimized or in the background if desired. Also, PC-Pakratt's multi-tasking allows you to run two data controllers simultaneously. Other features include complete parameter screens, binary and ASCII file transfers, macros, QSO logging, comprehensive help and much more.

Get a whole new outlook on ham radio
with PC-Pakratt for Windows from AEA.

Connect with us for your nearest AEA dealer or for a
PC- Pakratt for Windows fact sheet.
Call our literature request line at (800) 432-8873.

Advanced Electronic Applications, Inc.

PO Box C2160 / 2006 - 196th St. SW, Lynnwood, WA 98036
Sales: (206) 774-5554

AEA

Connect with us

North Korea is On the Air

The following is the press release on the North Korea operation:

After long and difficult preparations, a group of amateurs found an opportunity to operate from North Korea (P5).

In view of the most complicated political situation (which is well-known), the expedition has a higher probability of failure than of success. A license was issued by the military authorities of North Korea. It holds certain guarantees that the upcoming operation will take place. However, the DXpedition organizers have serious concern because there are many conditions, restrictions and stipulations imposed on them.

This DXpedition doesn't wish to undermine the major work done by the IARU group consisting of W1RU, OH2BH and others. In our case, a military (not civilian) license was issued. Moreover, the first operation from a previously "closed" country frequently "opens" that country for future ham radio activity.

The organizers decided not to appeal for funds and support to any clubs and associations before the upcoming operation, even though the expenses are very high. The risk is just too big and we feel we cannot risk other people's money. Everything was organized and funded privately by individuals from several countries.

After the DXpedition is over, DX-AC shall receive ORIGINALS of all available documents, licenses, passports, photographs, perhaps even video shots on location.

Because of restrictions imposed on the operators, they can transmit only the correspondent's callsign and his report. Please don't ask any questions on the air. Address all inquiries to the manager, JA1HGY. Donations can also be made via JA1HGY. Any support is welcomed.

The proposed callsign for the operation is P5RS7 (papa five radio sierra seven), to QRV-ONLY-CW and SSB. Standard DXpedition frequencies, QSX up!

There will be no RTTY or WARC bands, due to restrictions. We shall announce the names of all operators when the expedition is successful.

TNX Alan Kaul W6RCL; ARRL; DX Bulletin.

Coast Guard Goes No-Code!

The U.S. Coast Guard is putting Morse code to rest permanently. According to a press release, the decision to abandon listening for Morse code distress messages was based on the small amount of use that mode sees in maritime operations. As a result, the Guard issued the following standing orders to its crewmen:

Effective August 1, 1993, all United States Coast Guard communication stations and cutters will discontinue watchkeeping on the distress frequency 500 kHz, and will cease all Morse code services in the medium frequency radiotelegraphy band. More efficient telecommunication systems are now available to provide the mariner with options for initiating or relaying distress alerts, and passing and receiving maritime safety information. These options include INMARSAT, Radio Telex (SITOR), MF/HF single sideband and VHF radiotelephone, and satellite EPIRBS (for distress alerts and telecommunications), and INMARSAT Safetynet, NAVTEX and HF NAVTEX (SITOR) (for maritime safety information broadcasts).

NAVTEX broadcasts include the same notices to mariners, weather, search and rescue and fixed fishing gear location products that have been provided by the MF Morse broadcasts. Distress and other calls to any U.S. Coast Guard communications station can also be made on any of the following HF single sideband radiotelephone channels: 424 (4134 kHz), 601 (6200 kHz), 816 (8240 kHz), or 1250 (12242 kHz). Meteorological broadcasts are also made on these channels. We believe these options provide sufficient redundancy to ensure that adequate distress and safety communication capabilities are available. Questions or comments regarding this discontinuance of MF Morse telegraphy services can be sent to any Coast Guard Communications station or direct to U.S. Coast Guard Headquarters: Commandant (G-TTM), U.S. Coast Guard, Washington DC 20593; telex 892427

Continued on page 8

DAYTON Hamvention® '93

April 23, 24 & 25, 1993

Early Reservation Information

General Chairman, Dave Grubb, KC8CF

Asst. General Chairman, Ken Allen, KB8KE

✷ Giant 3 day Flea Market ✷ Exhibits ✷ Activities for the Non-Ham

Information

General Information: (513) 454-1456
FAX: (513) 890-5464 Attn: Hamvention,
or, write to
Hamvention, Box 964, Dayton, OH 45401-0964
Lodging Information: (513) 223-2612
(No Reservations by Phone)
Flea Market Information: (513) 454-1880 Daytime
(513) 767-1107 Evening

Lodging

Please write to **Lodging, Dayton Hamvention, Chamber Plaza, 5th & Main Streets, Dayton, OH 45402-2400** or refer to our 1992 Hamvention program for a listing of hotel/motels in the Dayton area.

Special Awards

Nominations are requested for Amateur of the Year, Special Achievement and Technical Excellence awards. Refer to the Hamvention Program for nomination form or contact Hamvention Awards Chairman, Box 964, Dayton, OH 45401-0964.

1993 Deadlines

Award Nominations: March 1
Advance Registration and Banquet:
USA - April 2 Canada - March 26
Flea Market Space: February 1

Flea Market

Flea Market Tickets (valid all 3 days) will be sold IN ADVANCE ONLY. No spaces sold at gate. A maximum of 3 spaces per person (non-transferable). Electricity is now available in a portion of the last Flea Market row for $40 additional per space. Rental tables and chairs are not available in the Flea Market. Vendors ***MUST*** order an admission ticket when ordering Flea Market spaces. Please send a separate check for Flea Market space(s) and admission ticket(s). Spaces will be allocated by the Hamvention committee from all orders received by February 1. Please use 1st class mail *only*.

Notification of Flea Market space assignment will be mailed by March 15, 1993. Checks will not be deposited until after the selection process is complete.

HAMVENTION Is sponsored by the Dayton Amateur Radio Association Inc.

Dayton Hamvention 1993

Advance Registration

Reservation Deadline: USA -April 2, Canada-March 26
Flea Market Reservation Deadline: February 1

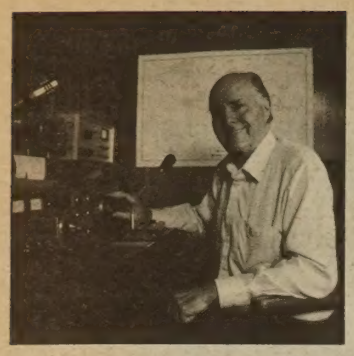
Enclose check or money order for amount indicated in U.S. dollars and type or print your name and address clearly.

Make checks payable to:
Dayton HAMVENTION
Mail to - Dayton Hamvention Box 1446, Dayton, OH 45401-1446

	How Many		
Admission (valid all 3 days)	_____	@ $11.00*	$_____
Grand Banquet	_____	@ $22.00**	$_____
Alt. Act. Luncheon (Saturday)	_____	@ $8.00	$_____
(Sunday)	_____	@ $8.00	$_____
Flea Market ‡	_____	$30/1 space	
(Max.3 spaces)	_____	$60/2 adjacent	
	_____	$150/3 adjacent	$_____
Electricity add	_____	$40.00/space	$_____
Covered tent	_____	$215.00 ea.	$_____
		Total	**$**_____

Name _____
Address _____
City _____
State Zip+4_____- _____ – _____
Daytime Phone # ( )_____Evening Phone # ( ) _____

* $14.00 at door
**$24.00 at door, if available



QLF

by Wayne Green W2NSD/1

Interesting Hams

There are a bunch of really interesting hams, you just have to be alert when one suddenly turns up and try not to lose him.

I ran into John Williams one day on the high end of 2m. It was back in 1948 and I was working for WPIX, channel 11 in New York, as a cameraman. I'd gotten permission to set my rig up on the 37th floor, next to the WPIX transmitter. I was using an SCR-522 at the time. I'd converted the receiver from crystal control to variable tuning. I bought a 16-element beam made by Bill Hoisington W2BAV and mounted it on a surplus prop-pitch motor out on the roof of the News Building. Wow, did I have a signal from up there!

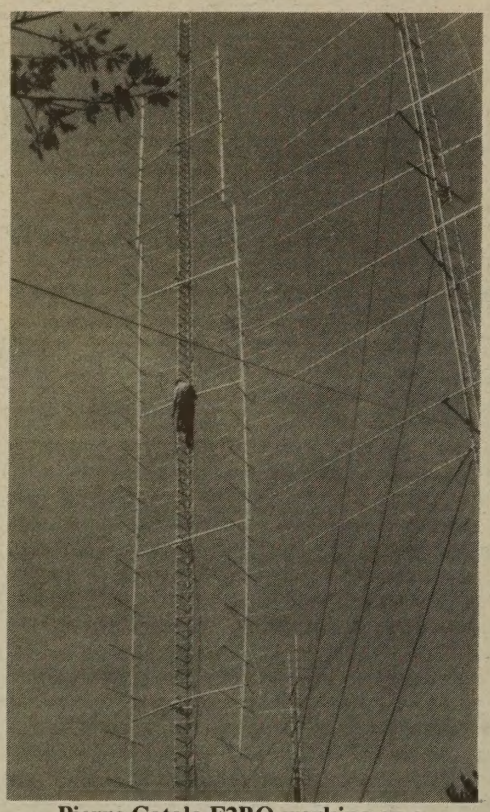
Bill was a fascinating chap and had his shack set up in a fire tower on top of a hill upstate. Little did I know that almost 20 years later I'd be publishing a ham magazine and Bill would move to Peterborough to be near my magazine and write an endless series of wonderful construction articles for me.

It was great operating from that 42nd Street Manhattan skyscraper. My 50-watt signal covered most of Connecticut, New Jersey and eastern New York. When the band would open up I'd hear New Jersey stations making DX contacts. Then, when the chaps in Connecticut would start working the DX, so could I, up there in the sky. I had a big advantage in working extended local stuff, but was at a great disadvantage on working skip.

I remember when Oscar W2KU would come on from Brooklyn with his 500-watt modulated oscillator. He'd wipe out a whole megacycle. That was before stabilization was required on 2m. But most of the ops were using crystal control, even then . . . quite a change from 1946, when 2m was first opened. Before that we had 2-1/2 meters (112-116 MHz), and almost everyone was using modulated oscillators.

Anyway, there was this strange beedle-beedle noise up on the high end of the band. I couldn't figure out what it was, so I asked around. Someone explained that this was a radio teletype net and that John Williams W2BFD was the guru. I didn't have the 8220 crystal it took to put me on 147.96, so I called him on the phone.

We quickly got to be good friends. John was a fantastic chap; I'll have to tell you more about him. He was the pioneer who made RTTY into a successful part of our hobby. He had a contract with Bell Telephone to get their retired equipment and sell it for ham use. He designed the terminal units (TUs) to tie the printers into our radios and he sent out endless bulletins on 96.



Pierre Catala F2BO working on a 336-element beam on top of Mt. Monadnock (New Hampshire) in 1964.

Using his plans, I built a terminal. It took over a dozen 6SN7GTXs and filled a 19" relay rack panel about 18" high, but it did everything. I had auto-start, auto-stop, and so on. John got me an old Model 12 Teletype printer, circa 1926, a huge clunk of a machine, and I was in business. From my home in Brooklyn I was able to contact RTTYers all around the greater New York area . . . over at least a 50-mile radius. I still run into some of the old gang now and then. Like Bill Maddox W2AUS who is now V85AA in Brunei.

Later I helped John set up a repeater on top of the Municipal Building in downtown Manhattan. Once that was going our range went out to well over 100 miles.

John had an endless fight with Bell over his automatic telephone answering system in his radio repair shop in Queens. That wasn't authorized Bell equipment so they wanted it out. He used a 78 rpm record player with the message and recorded on a wire recorder. It worked fine. Many years later Bell was taken to court and forced, over the bodies of endless battalions of Bell lawyers, to allow foreign equipment to be attached to their lines.

I tried to get John to start an RTTY newsletter, but he wasn't interested. Finally, when I got a job as a television director at WXEL in Cleveland in 1951, I saw they had a mimeo machine, so I published the first issue of a monthly *Amateur Radio Frontiers* newsletter. How could I even suspect that this would lead to a completely new direction in my life? Not that I would have been surprised, because my life had had little direction until then. Or, perhaps more accurately, many directions. I was zigging around through life like a butterfly in a field of flowers. A radio engineer-announcer in North Carolina, Virginia and Florida. A TV engineer, cameraman, director in New York, Dallas and Cleveland. An engineer with Airborne Instrument Labs on Long Island. A professional psychologist.

The newsletter expanded into a magazine while I bounced around as the Director of the Music Research Foundation, an engineer working on a Guggenheim grant on a color organ for the Guggenheim Museum on Fifth Avenue (both those jobs resulted from RTTY ham contacts), and finally, before I went into ham publishing full- time in 1955, I marketed a loudspeaker which quickly became a multimillion- dollar business. Through all this I was publishing my little magazine to a subscription list of about 2,000 fanatics. I wrote long editorials (you'll find that hard to believe, I know), did all the drafting of schematics, took the photos, set the type, sold the subscriptions, sold advertising, and so on . . . all in my spare time. The magazine never got larger than 32 pages, so it wasn't difficult to handle.

My work as the first active ham in New York on 6m got me in touch with Perry Ferrell, who was not a ham, but had a contract to research 6m propagation for the Air Force. I set up a beacon station with a code wheel sending my call and location for a year or so. Later, when Perry became the editor of *CQ*, he asked me to do an RTTY column for the magazine. Sure. We got to be good friends, so I knew he was frustrated at *CQ*. He hated the publisher and wasn't a ham himself. A couple years later *Popular Electronics* was started by the publishers of *Electronics World*. I'd been advertising my speakers in EW, so I knew the two publishers well . . . Ollie Reed and Bill Stocklin. Nice chaps. When they started *PE* I advertised in it too, so I knew they needed an editor. I recommended Perry and the next thing you know *CQ* didn't have an editor.

Oh, I forgot, I'm writing about John Williams. Well he's the one who started all this for me . . . the chap who changed my life from a manufacturer to a publisher. When Perry left for *PE*, that left *CQ* without an editor. It had never crossed my mind that I might take the job . . . but I did, and that's another interesting story. I soon had John writing RTTY articles and changed the magazine into one for hams interested in building and pioneering new technologies. I'd been a fanatic builder ever since that first box of radio parts got dumped on me one Sunday in 1937, so it was natural.

I suppose I should tell you about the FBI visits, asking about John. He hadn't said anything to me about it, but in addition to repairing radios and TVs, and getting RTTY going, he was also building miniature transmitters for spies. Later he told me he'd supplied transmitters for the Arabs to put on the Israeli consulate cars so they could follow behind and hear anything said.

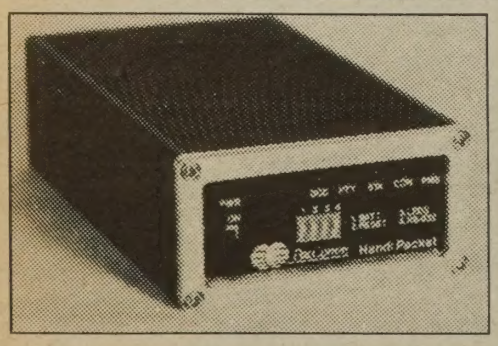
Alas, John was a heavy smoker, so he died much too soon. Amateur radio lost one heck of an experimenter and pioneer, but he left a legacy of a new aspect of the hobby . . . and for better or worse, this got me into ham publishing.

So what was so great about RTTY? Well, I enjoyed being able to come home and read everything that had been going on all day on the channel. If I didn't want to do this I could put the system on auto-call and it would print only messages addressed to me. My rig would even send a bleep to confirm that a message had been received. I punched out dozens of stories on tape and had them handy to send when the need came up. While an incoming message was being printed I'd punch out the start of my answer and just feed it into the tape reader when it was my time to transmit.

In those days, frequency-shift-keying (FSK) wasn't permitted on the low bands . . . except 11m. So I worked a few pioneers on 11m, including Bob Weitbrecht W6NRM, a deaf ham. RTTY was perfect for him. I also worked Bob on 80m, where we had to use make-break keying instead of FSK. This made it much tougher to get through.

For years we fought the ARRL to get FSK accepted on the low bands. The League had a firm policy of vigorously fighting any rule changes they hadn't proposed. This was in order to maintain their hold as the *only* national amateur radio organization. For years there wasn't one single rule change proposed by anyone else that they didn't oppose to the bitter end.

You can do pretty much the same things these days with packet that we were doing with RTTY. You can even write stuff and keep it on floppies to send when you want, just like we used to do with punched tape. It's just that we were doing all this over 40 years ago. That was the beginning of digital ham communications. I just wonder where we'd be today if John hadn't smoked. We lost another great ham pioneer the same way . . . I'll have to tell you about Sam Harris W1FZJ, another good friend, the chap who invented the parametric amplifier. RF



PacComm

• Advanced Technology
• Enduring Value

4413 N. Hesperides St., Tampa, FL 33614-7618
(813) 874-2980 Fax: (813)872-8696 (800)486-7388

HandiPacket PORTABLE PACKET CONTROLLER

"One of PacComm's Handipackets is
Aboard the MIR Space Station
Listen for U2MIR on 145.55 MHz"

Leading Provider of Packet Equipment for Amateur Radio

Get a beginner's packet setup, for only $65!
A serial port modem for your PC and a 'software TNC' diskette
Simply plug into the PC serial port and connect to your radio
Order BayMod-9 or Baymod-2

CIRCLE 152 ON READER SERVICE CARD

Radio Fun

MARCH 1993
issue #20

editor/publisher
Wayne Green W2NSD/1
editor/associate publisher
David Cassidy N1GPH

managing editor
Hope Currier
editorial associates
Sue Jewell
Joyce Sawtelle
contributing editors
Bill Brown WB8ELK
Mike Bryce WB8VGE
Joseph E. Carr K4IPV
Michael Geier KB1UM
Carole Perry WB2MGP
Jeffrey Sloman N1EWO
Gordon West WB6NOA

advertising sales manager
Dan Harper
advertising coordinator
Judy Walker

603–924-0058
800–274-7373
FAX 603-924-9327

graphic design
Suzanne Self
desktop page make-up
Linda Drew
Alice Scofield

circulation manager
Harvey Chandler
subscription services
800-257-2346

Wayne Green, Inc.
editorial offices
Radio Fun
70 Route 202-North
Peterborough, NH 03458
603-924-0058
FAX: 603-924-9327

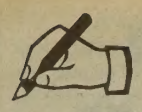
RADIO FUN (ISSN 1055-887X) is published monthly by Radio Fun, a division of Wayne Green, Inc., 70 Route 202-N, Peterborough NH 03458. Subscriptions: $14.00 per year. Canada add $8.00. Foreign add $12.00 surface/$32.00 airmail. Second class postage pending at Peterborough NH and additional mailing offices.

POSTMASTER: Send address corrections to RADIO FUN, P.O. Box 4926, Manchester NH 03108.

Entire contents ©1993 by Radio Fun. No part of this publication may be reproduced without written permission of the publisher.

Reprints: $2.00 per article. Back issues: $3.00 each.

letters



Write to: Radio Fun, 70 Route 202-N, Peterborough, NH 03458

Kevin Thomas KD4DYM, Louisville KY The uninitiated folks who may be interested in the hobby might be turned off by reading some of the letters from those who have become stagnant. I am a relatively new ham and have found nothing but fun, fun, fun in this hobby. In my 18 months or so of having my ticket I have found my way around the UHF and VHF bands. If you don't blow your own horn no one will, so here goes. Since then I have become a net control for a local ARES group, and become a member of a fine club that welcomes no-code Techs with open arms. I have also set up a packet station and am sending packets all over.

I am also hard at work on the code, doing my best to upgrade. If you don't go get it, it's not going to come to you. A word to all those who want something for nothing: Quit whining, get your thumb out of your mouth, get off your duff and earn that upgrade. Don't try to circumvent the system to get what you think is yours. This hobby was here years before the no-coders, like me, came along. It will be here years from now, so work for what you want.

Great publications, by the way. I read both *Radio Fun* and *73*.

Kevin Ross NØQEY, Wever IA As a newly licensed ham, I get a lot of good information from *Radio Fun*. Please keep up the good work. I especially like the technical articles on how various circuits work, and would like to see some articles that dig a little deeper, such as calibration and alignment procedures.

Chris Bremmer NØSHR, Fergus Falls MN Thanks for a magazine for those of us who aren't technical wizards but know enough about this great hobby to know what fun and hours of enjoyment it can bring. Please sign me up for a year's subscription.

Kenn Garner KDØIY, Butler MO My first exposure to ham radio was as a Cub Scout. We went to WØKNF's and all talked to a ham in Chicago. I then forgot all about it. About 13 years or so later I again became interested in becoming a ham. I called back to my home town and made contact with WØKNF, Dale. He helped me. I would like to nominate Dale as the ham's ham. There's no way of telling how many hams got started in his shack, even though he was in a town of only 2,000. And you never left empty-handed.

I spent many hours dissecting "junk" I had bought or was given at a hamfest. That was my theory training. I also took local ham classes. We had a new baby and I promised my wife (now NØODW) that I would not spend a lot of money on my new hobby (a big mistake) and would try to keep it close to self-supporting.

I got my first rig: a National NC303 and a Heathkit HX1681. Some electric fence wire and a salvaged piece of coax and I was on the air. My mother was a railroad telegrapher and she gave me her old J38 key that I still use.

On my second QSO my $20 transmitter blew up. Back to Dale's. A rummage through his junk box, a lesson on PA neutralizing, and I was back on the air. Dale also gave me a Heath VTVM on that trip to start out my test gear collection. So started the second phase of my hobby: fixing other people's junk. I really think I enjoy it as much as operating. It eventually led to my quitting my nice desk job and my wife putting me through tech school in electronics. Now I am a "radioman" at the Motorola shop here in Butler.

I upgraded to Advanced and really splurged. I upgraded to a Gonset GSB101 that almost worked, copperweld, and 70 ft. of new RG-8. A few hours (and a TR relay from Dale's junk box) and I was on SSB (and AM, and FM—well, PM—using slope detection on the 303).

That leads to my first gripe on the state of ham radio: appliance operators. I know a guy who had distorted RX audio and sent his rig back to the factory. They replaced the speaker. His eyes were so boggled by the knobs and lights he couldn't hear with his ears, I guess. I've spent hours on and off the air trying to convince these people that if they would spend a little time studying and learn the "conquer and divide" method of troubleshooting they would be capable of working on their equipment.

My wife is now a ham and my 10-year-old daughter and 14-year-old son are getting ready for a second try. We believe in a strong family relationship and preach being the best you can be even if you can't be the best. I can guarantee you they know what a resistor looks like and that a mixer is not what you use to make a cake.

And are we to blame for the complexity of the gear today and its high cost? I have very little money in the hobby but probably have as much fun as anyone. Sure, I look at the new AES catalog, but I spend hours with the Tucker, Fair and Ramsey catalogs.

I maintain that if you don't use a feature half the time you don't need it and it's only something to break. Most hams talk on two or three repeaters and maybe simplex, but yet they have $400 2 meter rigs with a zillion memories and even more buttons. With soon-to-be four hams in the family, I'd go broke. So I buy up their old crystal rigs for a song and keep Jan in business a little longer (scan boards are easy if we want that). I do have one synthesized mobile, an Amcom 225 I got for $25 because it doesn't scan and displays the TX frequency instead of the RX frequency (the guy said it didn't work but put out power).

Almost all my gear was bought damaged or traded for (remember my promise to my wife). We have tables at probably 10 hamfests a year and

Continued on page 12

MFJ's world famous
Ham Radio Accessories

Why do more hams throughout the world use MFJ accessories than any other brand? Because they are value packed and carry MFJ's one year unconditional guarantee!

MFJ Speaker Mics

Compact or miniature models for all popular HTs

Compact Speaker Mics, $24.95 each: MFJ-284 or MFJ-286 **$24.95**

Once you try an MFJ Speaker Mic you'll never want to be without it. You'll be able to carry your handheld on your belt and never have to remove it to monitor calls or talk.

You'll never have to turn up your audio annoyingly loud to monitor calls because it's handy lapel/pocket clip lets you keep it close to your ear for easy listening.

And you'll never have to clumsily remove your handheld from your belt holder to talk because you can conveniently take the speaker mic in one hand, press the push to talk button and talk. Measure 1¼'' x 2'' x 3''

They come with a lightweight retractable cord that eliminates the dangling cord problem. They feature excellent audio on both transmit and receive. **MFJ-284 for Icom or Yaesu; MFJ-286 for Kenwood.**

MFJ-283, MFJ-285, MFJ-285L, MFJ-287 or MFJ-287L **$24.95**

Miniature Speaker Mics, $24.95 each:

New miniature speaker mics pack all the features of the compact models into a tiny 2'' x 1¼'' x ¼'' package. The lapel pocket clip swivels for even more convenient positioning. Also features transmit LED. Choose from regular or ''L'' shaped connector. Order **MFJ-285 or MFJ-285L for Icom or Yaesu, MFJ-287 or MFJ-287L for Kenwood. MFJ-283 for dual plug Alinco.**

Deluxe 300 W Tuner

MFJ-949D **$149.95**

MFJ-949D is the world's most popular 300 watt PEP tuner. It covers 1.8-30 MHz, gives you a new peak and average reading Cross-Needle SWR/Wattmeter, built-in dummy load, 6 position antenna switch and 4:1 balun -- in a compact 10 x 3 x 7 inch cabinet. Meter lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

12/24 Hour LCD Clocks

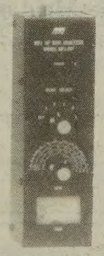
$19.95 MFJ-108B **$9.95** MFJ-107B

Huge 5/8 inch bold LCD digits let you see the time from anywhere in your shack. Choose from the dual clock that has separate UTC/local time display or the single 24 hour ham clock.

Mounted in a brushed aluminum frame. Easy to set. The world's most popular ham clocks for accurate logs. MFJ-108B 4½x1x2;MFJ-107B 2¼x1x2 in.

SWR Analyzer

MFJ-207 **$99.95**

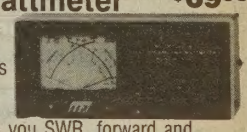


MFJ's innovative new SWR Analyzer gives you a complete picture of your antenna SWR over an entire band -- without a transmitter, SWR meter or any other equipment.!

Simply plug your antenna into the coax connector, set your SWR Analyzer to the frequency you want and read your SWR. You can instantly find your antenna's true resonant frequency,something a noise bridge can't do. Covers 1.8-30 MHz (or choose **MFJ-208, $89.95** for 2 Meters). Use 9 V battery or 110 VAC with MFJ-1312, $12.95.

MFJ Cross-Needle SWR/Wattmeter

MFJ-815B **$69.95**



MFJ Cross-Needle SWR/Wattmeter has a new **peak** reading function! It shows you SWR, forward and reflected power in 2000/500 and 200/50 watt ranges. Covers 1.8-30 MHz.

Mechanical zero adjusts for movement. SO-239 connectors. Lamp uses 12 VDC or 110 VAC with MFJ-1312, $12.95.

VHF SWR/Wattmeter

MFJ-812B **$29.95**

Covers 2 Meters and 220 MHz. 30 or 300 Watt scales. Also reads relative field strength 1-170 MHz and SWR above 14 MHz. 4½x2¼x3 in.

Deluxe Code Practice Oscillator

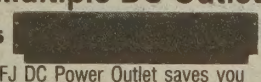
MFJ-557 **$24.95**

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base so it stays put on your table. Portable because it runs on a 9-volt battery (not included) or an AC adapter ($12.95) that plugs into a jack on the side.

Tone and Volume controls for a wide range of sound. Speaker, earphone jack. Key has adjustable contacts and can be hooked to transmitter. 8½x2¼x3¾ in.

MFJ Multiple DC Outlet

MFJ-1112 **$29.95**



New MFJ DC Power Outlet saves you space **and** money. Hook it to your 12 VDC power supply and get 6 DC outlets for connecting your accessories. RF bypassing keeps RF out of power supply from DC line outlet. 13½x2¾x2½ in.

Nearest Dealer/Orders: 800-647-1800

MFJ ENTERPRISES, INC.
Box 494, Miss. State, MS 39762
(601) 323-5869; **FAX:** (601) 323-6551
TELEX: 53 4590 MFJ STKV

• One year **unconditional** guarantee • 30 day **money back** guarantee (less s/h) on orders from MFJ • Add $5.00 each s/h • **FREE** catalog

MFJ . . . making quality affordable

CIRCLE 86 ON READER SERVICE CARD

An Easy CAT Program for the Yaesu FT-747GX

by Angelo Lamendola KC2NT

```
10 'ROUTINE NAME IS: START
20 CLS
30 PRINT "MAKE SURE CAPS LOCK IS ON!"
40 PRINT "-------------------------------------------------------------------"
50 PRINT "PRESS  A  TO SELECT VFO-A OR VFO-B"
60 PRINT "-------------------------------------------------------------------"
70 PRINT "PRESS  B  TO SET MODE"
80 PRINT "-------------------------------------------------------------------"
90 PRINT "PRESS  C  TO GET TO AN AMATEUR BAND"
100 PRINT "------------------------------------------------------------------"
110 REM PRINT "PRESS  D  TO GET AN SWL BAND"
120 PRINT "------------------------------------------------------------------"
130 PRINT "PRESS  E  TO TUNE  +  OR  -  500 kHz"
140 PRINT "------------------------------------------------------------------"
150 PRINT "PRESS  F  TO RECALL MEMORIES"
160 PRINT "------------------------------------------------------------------"
170 PRINT "PRESS  G  TO SET CLARIFIER AND DLOCK"
180 PRINT "------------------------------------------------------------------"
190 PRINT "PRESS  H  TO USE PTT OR TO TURN SPLIT ON OR OFF"
200 PRINT "------------------------------------------------------------------"
210 REM PRINT "PRESS  I  TO USE THE VFO TO MEMORY FUNCTION"
220 PRINT "------------------------------------------------------------------"
230 REM PRINT "PRESS  J  TO USE THE MEMORY TO VFO FUNCTION"
240 PRINT "------------------------------------------------------------------"
250 PRINT "PRESS  R  TO RETURN TO DOS"
260 X$=INPUT$(1)
270 IF X$="A" THEN 380
280 IF X$="B" THEN 390
290 IF X$="C" THEN 400
300 IF X$="D" THEN 410
310 IF X$="E" THEN 420
320 IF X$="F" THEN 430
330 IF X$="G" THEN 440
340 IF X$="H" THEN 450
350 IF X$="I" THEN 460
360 IF X$="J" THEN 470
370 IF X$="R" THEN 490
380 RUN "VFOCHOIC"
390 RUN "MODESET"
400 RUN "SETFREQ"
410 REM RUN "BCFRQSET"
420 RUN "UPDWN500"
430 RUN "MEMCALL"
440 RUN "CLARDLOK"
450 RUN "SPLT&PTT"
460 REM RUN "VFOTOMEM"
470 REM RUN "MEMTOVFO"
480 RESET
490 SYSTEM
500 END
```

Program 1. START.BAS - Main menu screen.

```
10 'ROUTINE NAME IS:  VFOCHOIC
20 CLS
30 PRINT "-------------------------------------------------------------------"
40 PRINT "MAKE SURE CAPS LOCK IS ON!"
50 PRINT "-------------------------------------------------------------------"
60 PRINT "PRESS  A  FOR VFO-A"
70 PRINT "-------------------------------------------------------------------"
80 PRINT "PRESS  B  FOR VFO-B"
90 PRINT "-------------------------------------------------------------------"
100 PRESS "PRESS  R  TO RETURN TO MAIN SCREEN
110 PRINT "------------------------------------------------------------------"
120 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
130 DIM CMD$(5)
140 GOSUB 150
150 X$=INPUT$(1)
160 IF X$="A" THEN 190
170 IF X$="B" THEN 220
180 IF X$="R" THEN 260
190 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H5)   'VFO-A
200 PRINT#1, CMD$;
210 RETURN 140
220 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)+CHR$(&H5) 'VFO-B
230 PRINT#1, CMD$;
240 RETURN 140
250 CLOSE 1
260 RUN "START.BAS"
270 END
```

Program 2. VFOCHOIC.BAS - Selects VFO A or B.

When I got my FT-747 CAT (Computer Aided Transceiver) transceiver, I searched for a program to use with it. Although there are many programs around, I very quickly discovered that these were for top-of-the-line FT-980 or FT-767 rigs or required VGA/EGA type graphics and a hard disk. My computer is a five-year-old PC clone with CGA graphics, and two 360K drives with a bare 512K of memory. Not only did I need a program for my machine configuration but the program had to be easy to write, easy to enter and to understand, and simple to use.

Last fall I read an article in *73* on writing a program and building a computer interface for the FT-980 (Art Harding K5YEF, "Universal CAT Interface," *73 Amateur Radio Today*, August 1991, p. 38). What was interesting about that article was the author's encouragement and advice to beginners. *[Ed. Note: To interface your computer with the FT-747, or most other CAT rigs, you will need a special interface that converts the TTL levels present in the rig to RS-232 levels that your computer can use. Appropriate interfaces are available from Yaesu (model# FIF232C), J•COM (see the December 1992 New Products section) or you can build one up as described in the 73 article just mentioned.]*

Some Useful CAT Programs

Obviously, I was hesitant to write a program; I had no guarantee that I could produce something workable. However, the article's suggestions aroused my curiosity. I had nothing to lose. I took to my GWBASIC programming manuals and after two months of "try and try again" I did come up with a program, as the author predicted in his article. The effort produced routines written in V.3.2 GWBASIC that are easily modified, use very simple commands, and can serve as models for developing new routines or even for developing programs for other transceivers. It has menus; it does not depend on special graphics cards and does not require a hard disk. In fact, it takes a little over 160K of memory. The progam uses single key-press commands to do whatever tuning the CAT instruction commands provide. To eliminate frequent accessing of the disk drive and to cut down access time, the files are mounted on a RAM drive.

I wrote 11 program files to cover all the necessary CAT commands that allow for transceiver tuning. In this article I have not included the routines for "MEMTOVFO," "VFOTOMEM," and "BCFRQSET" since they are too large to print here. "MEMTOVFO" and "VFOTOMEM" are closely modeled after "MEMCALL FILE"; "BCFRQSET" is based on the "SETFREQ FILE." These two routines are described in the article. I will gladly send printouts of these three routines to anyone having problems in entering them upon receipt of a S.A.S.E. with the request (225 Kaymar Drive, Rochester NY 14616). In addition, I can provide a disk with all of the routines; please enclose a 5-1/4" diskette with appropriate return postage and mailer. *[Ed. Note: We will also have these programs available for download from the 73/Radio Fun BBS under the filename CAT747.ZIP in the 73MAG file area. You can reach the BBS at (603) 924-9343.]*

There are five additional housekeeping files: (1) command.com; (2) vdisk.sys; (3) config.sys (to install the RAM disk); (4) begin.bat (for program start-up); and (5) the GWBASIC, V.3.2 program. I wrote the config.sys file to give the following but you may wish to modify or perhaps eliminate the BUFFERS and FILES entries.

Config.sys File Listing
BUFFERS=15
FILES=15
DEVICE=VDISK.SYS 180 512 64

This installs a virtual disk of 180 kb with a sector size of 512 bytes and with 64 directories. With a two-floppy-drive system, Config.Sys gives c: as the RAM disk assignment. On a hard disk with a C: drive, the RAM disk becomes a D: drive. Since a RAM disk is a volatile storage device, you can see that information is not permanently stored and

```
10 'ROUTINE NAME IS: MODESET
20 CLS
30 PRINT "-------------------------------------------------------------------"
40 PRINT " 1=LSB  2=USB  3=CWW  4=CWN  5=AMW  6=AMN  R=RETURN TO MAIN SCREEN"
50 PRINT "-------------------------------------------------------------------"
60 PRINT "ENTER SELECTION FROM ABOVE"
70 PRINT "-------------------------------------------------------------------"
80 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
90 DIM CMD$(5)
100 GOSUB 110
110 X$=INPUT$(1)
120 IF X$="1" THEN 190
130 IF X$="2" THEN 200
140 IF X$="3" THEN 210
150 IF X$="4" THEN 220
160 IF X$="5" THEN 230
170 IF X$="6" THEN 240
180 IF X$="R" THEN 280
190 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HC): GOTO 250
200 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)+CHR$(&HC): GOTO 250
210 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H2)+CHR$(&HC): GOTO 250
220 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H3)+CHR$(&HC): GOTO 250
230 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H4)+CHR$(&HC): GOTO 250
240 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H5)+CHR$(&HC): GOTO 250
250 PRINT#1, CMD$;
260 RETURN 100
270 CLOSE 1
280 RUN "START.BAS"
290 END
```

Program 3. MODESET.BAS - Selects operating mode.

```
10 'ROUTINE NAME IS: SETFREQ
20 CLS
30 PRINT "-------------------------------------------------------------------"
40 PRINT"MAKE SURE CAPS LOCK IS ON! THEN ENTER SELECTION FROM FOLLOWING LINES"
50 PRINT "-------------------------------------------------------------------"
60 PRINT "THIS ROUTINE ALLOWS SELECTION OF CW HAM BANDS"
70 PRINT "-------------------------------------------------------------------"
80 PRINT "NOTE! SELECTIONS SETTLE AT LOW END OF ADVANCED CLASS CW BANDS"
90 PRINT "-------------------------------------------------------------------"
100 PRINT "A=3.5275  B=7.0275  C=10.1025  D=14.0275  E=18.0705  F=21.0275"
110 PRINT "-------------------------------------------------------------------"
120 PRINT "G=24.99  H=28.0450  R=RETURN TO MAIN SCREEN"
130 PRINT "-------------------------------------------------------------------"
140 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
150 DIM CMD$(5)
160 GOSUB 170
180 IF X$="A" THEN 270
190 IF X$="B" THEN 280
200 IF X$="C" THEN 290
210 IF X$="D" THEN 300
220 IF X$="E" THEN 310
230 IF X$="F" THEN 320
240 IF X$="G" THEN 330
250 IF X$="H" THEN 340
260 IF X$="R" THEN 380
270 CMD$=CHR$(&H50)+CHR$(&H27)+CHR$(&35)+CHR$(0)+CHR$(&HA): GOTO 350
280 CMD$=CHR$(&H50)+CHR$(&H27)+CHR$(&70)+CHR$(0)+CHR$(&HA): GOTO 350
290 CMD$=CHR$(&H50)+CHR$(&H2)+CHR$(&H1)+CHR$(&H1)CHR$(&HA): GOTO 350
300 CMD$=CHR$(&H50)+CHR$(&H27)+CHR$(&H40)+CHR$(&H1)+CHR$(&HA): GOTO 350
310 CMD$=CHR$(&H50)+CHR$(&H70)+CHR$(&H80)+CHR$(&H1)+CHR$(&HA): GOTO 350
320 CMD$=CHR$(&H50)+CHR$(&H27)+CHR$(&H10)+CHR$(&H2)+CHR$(&HA): GOTO 350
330 CMD$=CHR$(0)+CHR$(&H90)+CHR$(&H49)+CHR$(&H2)+CHR$(&HA): GOTO 350
340 CMD$=CHR$(0)+CHR$(&H45)+CHR$(&H80)+CHR$(&H2)+CHR$(&HA): GOTO 350
350 PRINT#1, CMD$;
360 RETURN 160
370 CLOSE 1
380 RUN "START"
390 END
```

Program 4. SETFREQ.BAS - Sets frequency to low end of each band.

is lost when the machine is shut down. This means that you should use the RAM disk only to run your program(s).

The begin.bat file is used to load all needed files to the RAM drive, switch to drive C:, and start the GWBASIC program. This file is listed below.

```
Begin.Bat File
COPY/V GWBASIC.EXE C:
COPY/V *.BAS C:
C:
GWBASIC
```

The GWBASIC programs are titled as follows:

1. START: This program provides the main screen from which the various transceiver commands may be accessed.

2. VFOCHOIC: The A or B VFO is accessed by this routine.

3. MODESET: This permits setting the various operating modes.

4. SETFREQ: I designed SETFREQ to permit setting the transceiver to the low CW end of the amateur bands from 80 meters to 10 meters. It can be modified to the user's needs—for example, setting up for frequencies in the phone bands rather than in the CW bands.

5. UPDWN500: This is the transceiver command for tuning up or down 500 kHz.

6. MEMCALL: This command allows accessing any of the 20 memory channels.

7. CLARDLOK: Clarifier On-Off as well as locking or unlocking of the clarifier is done with this program.

8. SPLT&PTT: Turn-On or Off of "SPLIT" as well as the transmit/receive function is done by this program.

NOTE: The following three programs were too large to print out in this article. The programs are available from the *73/Radio Fun* telephone BBS or from the author (see text):

9. VFOTOMEM: Programming a VFO frequency to memory is done with this routine.

10. MEMTOVFO: The program allows a memory channel to be brought up on a VFO.

11. BCFRQSET: This turns on VFO-B and enables the operator to hop to any of the following SWL bands: 49m, 31m, 21/22m, 19m, 16m, 13m.

Getting Started

The eight programs presented in this article were originally developed to run alone and can be easily modified to do that. *Make sure that the "Caps Lock" key is turned on when using the program.* After inserting your boot disk into the drive and starting the machine, type BEGIN at the A> prompt. This will place the program on RAM disk and load GWBASIC. After that, issue the following command: LOAD "Start." On the OK from GWBASIC, enter the RUN command. The main menu screen will appear and the various routines with their menu screens can be retrieved. To leave the program and return to DOS, get to the main screen and enter R.

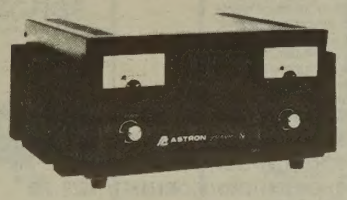
This program does not need a data stream from the transceiver and does not use one. The FT-747 does not send an OK indicating that the received command was correct, as is done on the FT-980. The FT-747 does not have that command. So, when entering the program or making modifications to it, make sure that the program commands are correct; otherwise, you may be sending confusing signals that may perhaps lock up the transceiver. This will necessitate having to reset your system.

In the course of my project I have had a chance to compare the computer command sets for the FT-980 and the FT-757 against those for the FT-747. There appears to be a wide variation in the number of commands available among the three transceivers: The FT-980 has 30 commands, the FT-757 has 11 and the FT-747 has 14. Furthermore, these commands appear to generally differ between the three transceivers. I can only conclude that you have to write your own program unless you purchase a popular and expensive system for which a program is available.

I have been using this program on my five-year-old Heathkit H-148 PC clone interfaced to my FT-747GX. It runs smoothly and efficiently. Obviously, it has no frills; however, neither does the FT-747GX. Together, they make a fully workable system. The routines are functional; they get results. It appears to be a good solid start upon which to develop a more sophisticated program with frills, bells, and whistles. I have learned and am still learning something about programming. Also, I better understand the computer section of my transceiv-

ASTRON CORPORATION
9 Autry
Irvine, CA 92718
(714) 458-7277

ASTRON POWER SUPPLIES
• HEAVY DUTY • HIGH QUALITY • RUGGED • RELIABLE •


MODEL VS-50M

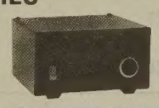
SPECIAL FEATURES
- SOLID STATE ELECTRONICALLY REGULATED
- FOLD-BACK CURRENT LIMITING Protects Power Supply from excessive current & continuous shorted output
- CROWBAR OVER VOLTAGE PROTECTION on all Models except RS-3A, RS-4A, RS-5A, RS-4L, RS-5L
- MAINTAIN REGULATION & LOW RIPPLE at low line input Voltage
- HEAVY DUTY HEAT SINK • CHASSIS MOUNT FUSE
- THREE CONDUCTOR POWER CORD except for RS-3A
- ONE YEAR WARRANTY • MADE IN U.S.A.

PERFORMANCE SPECIFICATIONS
- INPUT VOLTAGE: 105-125 VAC
- OUTPUT VOLTAGE: 13.8 VDC ± 0.05 volts (Internally Adjustable: 11-15 VDC)
- RIPPLE Less than 5mv peak to peak (full load & low line)
- All units available in 220 VAC input voltage (except for SL-11A)

SL SERIES

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• LOW PROFILE POWER SUPPLY						
SL-11A	•	•	7	11	2¾ x 7⅝ x 9¾	11

RS-L SERIES



MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• POWER SUPPLIES WITH BUILT IN CIGARETTE LIGHTER RECEPTACLE				
RS-4L	3	4	3½ x 6⅛ x 7¼	6
RS-5L	4	5	3½ x 6⅛ x 7¼	7

RM SERIES MODEL RM-35M

• 19" RACK MOUNT POWER SUPPLIES

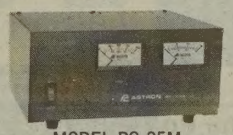
MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RM-12A	9	12	5¼ × 19 × 8¼	16
RM-35A	25	35	5¼ × 19 × 12½	38
RM-50A	37	50	5¼ × 19 × 12½	50
RM-60A	50	55	7 × 19 × 12½	60
• Separate Volt and Amp Meters				
RM-12M	9	12	5¼ × 19 × 8¼	16
RM-35M	25	35	5¼ × 19 × 12½	38
RM-50M	37	50	5¼ × 19 × 12½	50
RM-60M	50	55	7 × 19 × 12½	60

RS-A SERIES

MODEL RS-7A

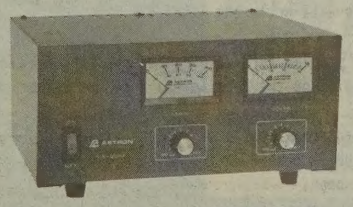
MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-3A		•	2.5	3	3 × 4¾ × 5¾	4
RS-4A	•	•	3	4	3¾ × 6½ × 9	5
RS-5A		•	4	5	3½ × 6⅛ × 7¼	7
RS-7A	•	•	5	7	3¾ × 6½ × 9	9
RS-7B	•	•	5	7	4 × 7½ × 10¾	10
RS-10A	•	•	7.5	10	4 × 7½ × 10¾	11
RS-12A	•	•	9	12	4½ × 8 × 9	13
RS-12B		•	9	12	4 × 7½ × 10¾	13
RS-20A	•	•	16	20	5 × 9 × 10½	18
RS-35A	•	•	25	35	5 × 11 × 11	27
RS-50A	•		37	50	6 × 13¾ × 11	46

RS-M SERIES


MODEL RS-35M

MODEL	Continuous Duty (Amps)	ICS* (Amps)	Size (IN) H × W × D	Shipping Wt. (lbs.)
• Switchable volt and Amp meter				
RS-12M	9	12	4½ × 8 × 9	13
• Separate volt and Amp meters				
RS-20M	16	20	5 × 9 × 10½	18
RS-35M	25	35	5 × 11 × 11	27
RS-50M	37	50	6 × 13¾ × 11	46

VS-M AND VRM-M SERIES


MODEL VS-35M

• Separate Volt and Amp Meters • Output Voltage adjustable from 2-15 volts • Current limit adjustable from 1.5 amps to Full Load

MODEL	Continuous Duty (Amps) @13.8VDC	@10VDC	@5VDC	ICS* (Amps) @13.8V	Size (IN) H × W × D	Shipping Wt. (lbs.)
VS-12M	9	5	2	12	4½ × 8 × 9	13
VS-20M	16	9	4	20	5 × 9 × 10½	20
VS-35M	25	15	7	35	5 × 11 × 11	29
VS-50M	37	22	10	50	6 × 13¾ × 11	46
• Variable rack mount power supplies						
VRM-35M	25	15	7	35	5¼ × 19 × 12½	38
VRM-50M	37	22	10	50	5¼ × 19 × 12½	50

RS-S SERIES

MODEL RS-12S

• Built in speaker

MODEL	Colors Gray	Colors Black	Continuous Duty (Amps)	ICS* Amps	Size (IN) H × W × D	Shipping Wt. (lbs.)
RS-7S	•	•	5	7	4 × 7½ × 10¾	10
RS-10S	•	•	7.5	10	4 × 7½ × 10¾	12
RS-12S	•	•	9	12	4½ × 8 × 9	13
RS-20S	•	•	16	20	5 × 9 × 10½	18

*ICS—Intermittent Communication Service (50% Duty Cycle 5min. on 5 min. off)

CIRCLE 16 ON READER SERVICE CARD

```
10 'ROUTINE NAME IS : UPDWN500
20 CLS
30 PRINT "-------------------------------------------------------------"
40 PRINT "MAKE SURE CAPS LOCK IS ON!
50 PRINT "-------------------------------------------------------------"
60 PRINT "PRESS  +  TO GO UP 500 KHZ"
70 PRINT "-------------------------------------------------------------"
80 PRINT "PRESS  -  TO GO DOWN 500 KHZ"
90 PRINT "-------------------------------------------------------------"
100 PRINT " PRESS  R  TO RETURN TO MAIN SCREEN"
110 PRINT "-------------------------------------------------------------"
120 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN: FOR RANDOM AS #1"
130 DIM CMD$(5)
140 GOSUB 150
150 X$=INPUT$(1)
160 IF X$="+" THEN 190
170 IF X$="-" THEN 200
180 IF X$="R" THEN 230
190 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H7):GOTO 210
200 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H8):GOTO 210
210 PRINT#1, CMD$;
220 RETURN 140
230 RUN "START.BAS"
240 END
```

Program 5. UPDWN500 - Tunes up or down 500 kHz.

```
10 'ROUTINE NAME IS:  MEMCALL
20 CLS
30 PRINT "-------------------------------------------------------------"
40 PRINT"THE FOLLOWING LIST INDICATES THE KEY TO PRESS FOR A DESIRED CHANNEL"
50 PRINT "-------------------------------------------------------------"
60 PRINT "0 = CH 00  1 = 01  2 = 02  3 = 03  4 = 04  5 = 05  6 = 06  0 = 07"
70 PRINT "-------------------------------------------------------------"
80 PRINT "8 = CH 08  9 = 09  A = 10  B = 11  C = 12  D = 13  E = 14  F = 15"
90 PRINT "-------------------------------------------------------------"
100 PRINT "G = CH 16  H = 17  I = 18  J = 19  R = RETURN TO MAIN SCREEN"
110 PRINT "-------------------------------------------------------------"
120 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
130 DIM CMD$(5)
140 GOSUB 150
150 X$=INPUT$(1)
160 IF X$="0" THEN 370
170 IF X$="1" THEN 380
180 IF X$="2" THEN 390
190 IF X$="3" THEN 400
200 IF X$="4" THEN 410
210 IF X$="5" THEN 420
220 IF X$="6" THEN 430
230 IF X$="7" THEN 440
240 IF X$="8" THEN 450
250 IF X$="9" THEN 460
260 IF X$="A" THEN 470
270 IF X$="B" THEN 480
280 IF X$="C" THEN 490
290 IF X$="D" THEN 500
300 IF X$="E" THEN 510
310 IF X$="F" THEN 520
320 IF X$="G" THEN 530
330 IF X$="H" THEN 540
340 IF X$="I" THEN 550
350 IF X$="J" THEN 560
360 IF X$="R" THEN 600
370 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H2): GOTO 570
380 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)+CHR$(&H2): GOTO 570
390 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H2)+CHR$(&H2): GOTO 570
400 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H3)+CHR$(&H2): GOTO 570
410 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H4)+CHR$(&H2): GOTO 570
420 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H5)+CHR$(&H2): GOTO 570
430 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H6)+CHR$(&H2): GOTO 570
440 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H7)+CHR$(&H2): GOTO 570
450 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H8)+CHR$(&H2): GOTO 570
460 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H9)+CHR$(&H2): GOTO 570
470 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HA)+CHR$(&H2): GOTO 570
480 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HB)+CHR$(&H2): GOTO 570
490 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HC)+CHR$(&H2): GOTO 570
500 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HD)+CHR$(&H2): GOTO 570
510 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HE)+CHR$(&H2): GOTO 570
520 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HF)+CHR$(&H2): GOTO 570
530 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H10)+CHR$(&H2): GOTO 570
540 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H11)+CHR$(&H2): GOTO 570
550 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H12)+CHR$(&H2): GOTO 570
560 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H13)+CHR$(&H2): GOTO 570
570 PRINT#1, CMD$;
580 RETURN 140
590 CLOSE 1
600 RUN "START.BAS"
610 END
```

Program 6. MEMCALL - Accesses any of the 20 memory channels.

```
10 'ROUTINE NAME IS CLARDLOK
20 CLS
30 PRINT "MAKE SURE CAPS LOCK IS ON!
40 PRINT "-------------------------------------------------------------"
50 PRINT "PRESS  A  TO TURN ON CLARIFIER"
60 PRINT "-------------------------------------------------------------"
70 PRINT "PRESS  B  TO TURN OFF CLARIFIER"
80 PRINT "-------------------------------------------------------------"
90 PRINT "PRESS  C  TO TURN ON DLOCK"
100 PRINT "-------------------------------------------------------------"
110 PRINT "PRESS  D  TO TURN OFF DLOCK"
120 PRINT "-------------------------------------------------------------"
130 PRINT "PRESS  R  TO RETURN TO MAIN SCREEN"
140 PRINT "-------------------------------------------------------------"
150 OPEN "COM1: 4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
160 DIM CMD$(5)
170 GOSUB 180
180 X$=INPUT$(1)
190 IF X$="A" THEN 240
200 IF X$="B" THEN 250
210 IF X$="C" THEN 260
220 IF X$="D" THEN 270
230 IF X$="R" THEN 310
240 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)CHR$(&H9): GOTO 280
250 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)CHR$(&H9): GOTO 280
260 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)CHR$(&H4): GOTO 280
270 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)CHR$(&H4): GOTO 280
280 PRINT#1, CMD$;
290 RETURN 170
300 CLOSE 1
310 RUN "START.BAS"
320 END
```

Program 7. CLARDLOK - Clarifier ON/OFF and digital lock ON/OFF.

```
10 'ROUTINE NAME IS: SPLT&PTT
20 CLS
30 PRINT "MAKE SURE CAPS LOCK IS ON!"
40 PRINT "-------------------------------------------------------------"
50 PRINT "PRESS  C  TO TURN ON SPLIT"
60 PRINT "-------------------------------------------------------------"
70 PRINT "PRESS  D  TO TURN OFF SPLIT"
80 PRINT "-------------------------------------------------------------"
90 PRINT "PRESS  R  TO RECEIVE"
100 PRINT"-------------------------------------------------------------"
110 PRINT"PRESS  T  TO TRANSMIT"
120 PRINT"-------------------------------------------------------------"
130 PRINT"PRESS  E  TO RETURN TO MAIN SCREEN"
140 OPEN "COM1:4800,N,8,2,RS,CS,DS0,BIN" FOR RANDOM AS #1
150 DIM CMD$(5)
160 GOSUB 170
170 X$=INPUT$(1)
180 IF X$="C" THEN 230
190 IF X$="D" THEN 240
200 IF X$="R" THEN 250
210 IF X$="T" THEN 260
220 IF X$="E" THEN 300
230 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)+CHR$(&H1): GOTO 270
240 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1): GOTO 270
250 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&HF): GOTO 270
260 CMD$=CHR$(0)+CHR$(0)+CHR$(0)+CHR$(&H1)+CHR$(&HF): GOTO 270
270 PRINT#1, CMD$;
280 RETURN 160
290 CLOSE 1
300 RUN "START.BAS"
310 END
```

NOTE 1: For those unfamiliar with creating a batch file, (a) get to the A:\> prompt, (b) type COPY CON CONFIG.SYS (or BEGIN.BAT), (C) enter the file listing as shown in the article, (d) at end of listing, press the CTRL Z keys and then press ENTER key (carriage return key). This will write the file to disk.

NOTE 2: The main program (driver program) and the seven routines may be changed to allow the user to adapt it to his/her radio.

NOTE 3: In the fraternal spirit of amateur radio the program is offered in the PUBLIC DOMAIN in the hope that it will encourage others as I have been.

Program 8. SPLT&PTT - Split ON/OFF and Transmit/Receive function.

er. To those wishing to try my program I would suggest reading the article by K5YEF in the August 1991 issue of *73* (referenced above). It has some encouraging advice to those hesitant or timid radio amateurs who need to program for computer-assisted transceiving. One final note: I cannot accept responsibility for any direct or any indirect damage from the use of these free programs. Good luck and happy CAT QSO's. RF

Continued from page 3

(COASTGUARDWASH)+; telefax: (202) 267-4106 or 267-4662.

Signed, Capt. R. Hammond; Deputy Chief; Office of Command, Control and Communications; U.S. Coast Guard, by direction.

In other words, if you have an emergency in waters patrolled by the Coast Guard, leave your J-38 key at home and have a laptop computer with you. Otherwise, you might as well look for help in the middle of a 20 meter CW pile-up—after August 1st.

TNX Westlink Report #641, January 14, 1993.

Tools for the DXer

The following is a list of reliable publications that give good value for the money. It isn't exclusive; other excellent publications and sources exist.

Bulletins and Magazines

The DX Bulletin Weekly. $32/yr. Second Class, $42/yr. First Class. Send SASE for sample to: Box 50, Fulton CA 95439.

QRZ DX Weekly DX bulletin. $36/yr. First Class. Send SASE for sample to: Box 832205, Richardson TX 75083.

DX Magazine Monthly DX magazine. $15/yr. Box 50, Fulton CA 95439.

NCJ The *National Contest Journal*. The bimonthly ARRL contest magazine; covers subjects of interest to DXers, too. $10/yr. ARRL, 225 Main St., Newington CT 06111.

The W6GO/K6HHD List Monthly directory of QSL managers and information. $25/yr., single copies are $2.50. Box 700, Rio Linda CA 95673.

The W6TI Bulletin The Northern California DX Club sponsors this on-the-air bulletin each Sunday at 1800 PST (0200 UT Monday) on 7.015 and 14.002 MHz.

ARRL DX Bulletins Late-breaking DX news from W1AW on phone, CW, RTTY, and packet. See *QST* for schedules.

DX Columns *QST, CQ, 73,* and *Worldradio* all publish monthly DX columns. A great deal of useful information appears in these columns, but publication lead times make them a poor source of late-breaking news.

DX Spotting Nets Your area probably has a DX packet cluster system operating on 2 meters. A packet spotting net is the best tool yet for sharing current DX "spots," propagation data, and QSL routes. Ask a local DXer for the frequencies and other details.

Other DX Info Sources

Books You will find dozens on various aspects of DXing, ranging from travelogues to "how-to" books. Especially good: *The Complete DX'er* by Bob Locher W9KNI ($12), and *The DXCC Companion* by Jim Kearman KR1S ($6).

Other Publications Other specialized publications useful to the DXer include award directories, country lists, zone maps, and computer programs. Their publishers advertise

Continued on page 16

TOLL FREE **1-800-666-0908**

PRICING AND ORDERS ONLY

KENWOOD

TS-450S/AT

TM-741A

TH 78A

Full KENWOOD line
Radios & Accessories

YAESU

FT-5200

FT-411E & FT-415 *NEW!*

FT-470

FT 890AT

Call for All YAESU
Radios & Accessories

ALINCO

DJ580T

UR599T

Full line of Radios
and Accessories

ICOM

IC-W2A

IC-229H

IC-735

Full ICOM line
Radios & Accessories

C558A

STANDARD

Full line of Radios
and Accessories

AEA • ASTRON • COMET • CUSHCRAFT • DIAMOND • KANTRONICS • MFJ • SANGEAN • SONY SHORTWAVE • DRAKE • MANY MORE . . .

NEW EQUIPMENT PRICING AND ORDERS 1-800-666-0908 OUT OF STATE
TECHNICAL, USED GEAR, INFO 203-666-6227 24HR FAX 203-667-3561

LENTINI COMMUNICATIONS INC.

21 GARFIELD STREET. NEWINGTON. CT 06111

Hours: M-F 10-6.
SAT. 10-4

C.O.D.s OK
Same Day Shipping

CIRCLE 234 ON READER SERVICE CARD

Why buy a TNC?

PC HF FAX + PC SWL $179.00

SPECIAL COMBINATION OFFER

For a limited time, if you order PC HF FAX $99 (see our other ad in this issue), you can add our new and improved PC SWL 3.0 for $80.00 instead of our regular low price of $99.00.

PC SWL contains the hardware, software, instructions and frequency lists needed to allow you to receive a vast variety of digital broadcasts transmitted over shortwave radio. All you need is any IBM PC or compatible computer and an SSB shortwave receiver. The product consists of:

Demodulator
Digital Signal Processing Software
200 Page Tutorial Reference Manual
World wide Utility Frequency List
Tutorial Audio Cassette with Samples

PC SWL automatically decodes Morse code, RTTY, AMTOR, SITOR, NAVTEX and ASCII.

PC SWL lets you tune in on world press services meteorological broadcasts, ham radio operators, coastal shore stations, aviation telex and much more digital action on the shortwave bands. Why pay for another expensive box when a simple interface and your PC can do the job?

ADVANCED FEATURES:

Tuning Oscilloscope
Digital Waveform Presentations
Auto Calibration and Code Recognition
Continuously Tunable Filter Frequencies
Variable Shift
Adjustable CW Filter Sensitivity
Unattended Capture and Printing
Integrated Text Editor
Integrated Log and Database
Shell to DOS applications
Seamless Integration with PC HF Facsimile

Call or write for our complete catalog of products.
Visa & MasterCard welcome.

Software Systems Consulting
615 S. El Camino Real, San Clemente, CA 92672
Tel:(714)498-5784 Fax:(714)498-0568

CIRCLE 244 ON READER SERVICE CARD

YOU'VE GOT TO BE THERE!

GREATER BALTIMORE HAMBOREE AND COMPUTERFEST

LARGEST IN THE MID-ATLANTIC AREA
16,000 ATTENDED LAST YEAR
MARCH 27 & 28, 1993
Maryland State Fairgrounds
Timonium, Maryland

Three Buildings • Over 700 Spaces
Amateur Radio Manufacturers and Dealers
Indoor Fleamarket • Outdoor Tailgate
FCC Exams • Acres of Free Parking

Call: 1-800-HAM-FEST
In MD: 1-410-HAM-FEST
Anytime, for voice or FAX Info

Write: G.B.H.& C.
Post Office Box 95
Timonium, MD 21094

BATTERIES

REPLACEMENT BATTERIES
(ALL NEW—MADE IN USA)

ICOM

7S 13.2v 1200 mah	$54.00
8S 9.6v 1200 mah	$52.00
BP7 13.2v 600 mah	$59.00
BP8 8.4v 1200 mah	$59.00

SA/SAT

BP82, BP83	
BP83A 7.2v 750 mah	
BP84 7.2v 1000 mah 3"	$40.00
BP85A 9.6v 600 mah 3"	$69.00
BP85B 12v **600** mah 3"	$69.00

KENWOOD

PB1 12v 1000 mah	$59.00
KNB4 7.2v 2200 mah	$59.00
PB6 7.2v 750 mah	$46.00
PB7 7.2v 1500 mah	$55.00
PB8 12v 800 mah	$49.00

☆ ☆ ☆ ☆ ☆ *NOW AVAILABLE* ☆ ☆ ☆ ☆ ☆

FAST AND STANDARD DESK CHARGERS

FOR

YAESU, KENWOOD, ICOM, ALINCO and MOTOROLA.

These "SMART" Chargers Will Rapid Charge 6 Volt to 12 Volt Batteries in 1/2 Hour To Two Hours
(depending on Battery Capacity)

Many Advanced Features Not Available On Any Other Charger.

☆ ☆ ☆ ☆ *SPECIAL INTRODUCTORY PRICES* ☆ ☆ ☆ ☆ ☆

Made in U.S.A .

NEW

ALINCO

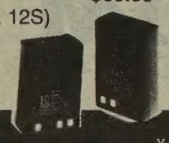
16N 7.2V 750 mah	$35.00
18N 12V 600 mah	$45.00

YAESU

FNB 25 7.2V 600 mah
FNB 26 7.2V 1000 mah
FNB 26A 9.6V 800 mah
FNB 27 12V 600 mah
FNB 27S 12V 800 mah

YAESU

FNB-2 v 500 mah	
FNB-2 v 600 mah	
FNB-4A 12V 1000mah	$55.00
FNB-17 7.2V 600mah	$30.00
FNB-10S 7.2v 1000 mah	$42.00
FNB-12S 12v 600 mah	$45.00
290 charger	$65.00
(For FNB 17,10S, 12S)	



Now Available:

ALINCO 580

EBP-20N	7.2V	800 mah
EBP-20NX	7.2V	1200 mah
EBP-22N	12V	800 mah

EDC-34 RAPID CHARGER $81.00

INSERTS

CALL FOR LOWEST PRICES

ALINCO 10N, 12N
AZDEN 3000, 4000
ICOM BP-2, 3, 5, 7, 8, 7S, 8S
KENWOOD PB-21, 21H, 25, 26
REGENCY MT1000, HX1200
SANTEC 142, 144
STANDARD BP-1
TEMPO S-1, 2, 4, 5, BP-15, S-15
TEN TEC 2991, 2591
UNIDEN (BEARCAT)

CELLULAR

MITSUBISHI	$50.00
NEC	$45.00
NOVATEL	$45.00
PANASONIC Bag Phone Kits	$45.00
MOTOROLA "FLIP"	$60.00

CAMCORDER

JVC

PANASONIC
PVBP80/88 12v 2.3 amps* $36.00

RCA/HITACHI
Full size
VHS-C

SONY
NP22
NP55/77 2400 mah $39.00

ALL BRANDS AVAILABLE

*original Panasonic

*ALL BATTERY PACKS—GUARANTEED TO HAVE THE ADVERTISED CAPACITY

SEND FOR FREE CATALOG

DEALER INQUIRIES WELCOME

BATTERY-TECH, INC.

28-25 215 PLACE, BAYSIDE, N.Y. 11360 FAX 718-461-1978

800-442-4275 — N.Y.S. 718-631-4275

VISA MASTER CARD DISCOVER

CIRCLE 105 ON READER SERVICE CARD

Handy-Dandy Coax Adapter Box

by Robert C. Green W3RZD

If you live along the Middle Atlantic seaboard, as we do, you have to be on the alert during hurricane season, and be on the lookout for severe storms and high winds in the winter. When severe conditions exist, evacuation may be necessary.

A lot of the residents in the area have evacuation kits that contain food, medicine, clothing and a portable radio. We have such a kit that also includes emergency radio gear. During an emergency most communications are handled on 2 meters, so our kit contains a take-apart 2 meter ground plane antenna, coax and adapters, and extra batteries. The kit is intended to be used with our handheld; the handheld is not actually in the kit, but it can be grabbed in a hurry.

To minimize the number of RF adapters carried, I made a box that would handle just about any female coax adapter problem that might arise. For example, suppose you have a cable with an RCA male that has to be joined to an N male. I think you will admit that this would be an oddball adapter, but by using the box and connecting the cables into their respective jacks you have the adapter. I liked the idea so much that, after making the box for the kit, I made another for use around the shack, and it has proven to be a godsend.

Construction

The adapter is built in an aluminum mini-box, 5" long and 2-1/4" square on the ends. On the top I mounted 10 female coax connectors in two rows: two RCA, one N, two F, two SO-239, two BNC and a 1/4" audio. Another SO-239 is mounted on one of the end panels and on the other end panel is a Motorola jack, a binding post for a long wire antenna, and a grounding bolt. The RCA jacks and the 1/4" jack have plastic insulation instead of cardboard or fiber, which makes for less loss at UHF.

After mounting all the connectors, the center posts were wired together, starting at the end panel SO-239. Two #20 gauge uninsulated wires were soldered to this connector, and a wire was threaded down each row of connectors. After soldering the row of wires to the center posts of the connectors, solder them to the Motorola jack. This places the connectors in parallel, and even if a wire breaks between any of the connectors they are still tied together. At this point I checked the SWR on the 2 meter band, using the end panel SO-239 and the Motorola jack, and it was 2:1. This isn't bad, considering the frequency and spacing between the inner connecting wires and the box sides.

Mini-UHF and TNC connectors were not used because we didn't have any in the junk box. I plan to make a new box for the emergency kit that will include two of each, and a 1/8" jack. This means that a bigger box will be required, perhaps one that is 5" x 4" on the top and 2" high.

If you decide to construct the adapter box, choose your own layout, but be sure to use two of each of the most common connectors. *Don't* use a plastic box—instead, use an aluminum box, which has a larger RF path and will afford shielding.

The box is not a panacea for all coax connector problems, but it does go a long way towards eliminating some of the dilemma. RF

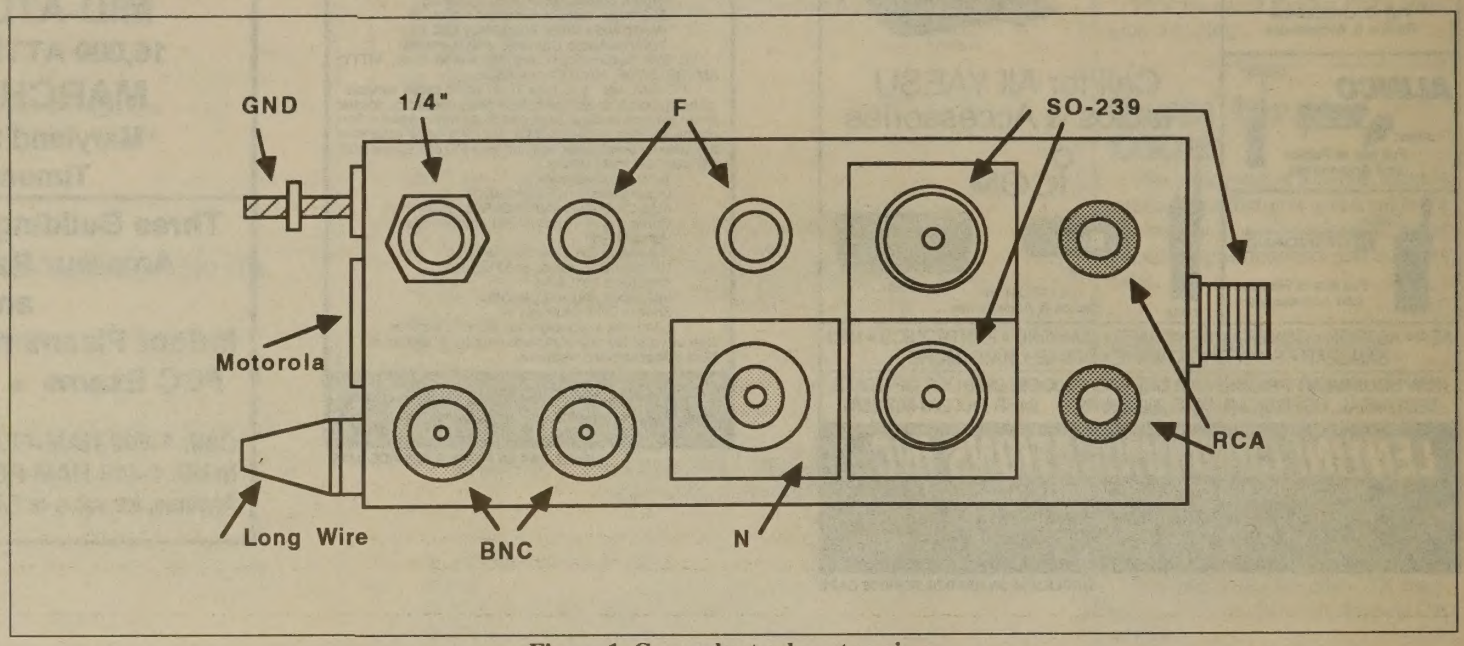


Figure 1. Coax adapter box, top view.

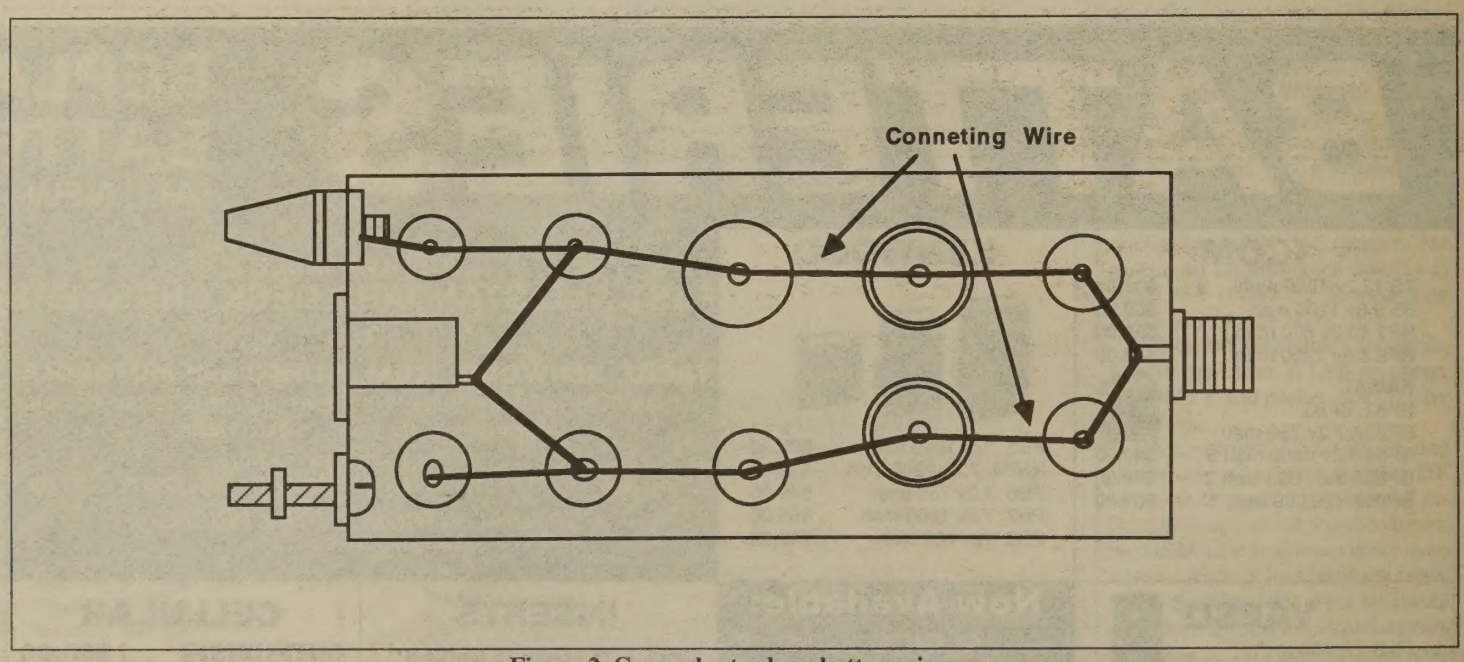


Figure 2. Coax adapter box, bottom view.

"Our products *speak*... for themselves"

DIGITAL VOICE RECORDER
NEW! AudioQ218
✓ UP TO 218 SECONDS RECORD TIME
✓ UP TO 8 MESSAGES
✓ 4 SAMPLE RATES
✓ SPEAKER OUTPUT
✓ LO LEVEL OUTPUT
✓ 4 MEG OF RAM
✓ LO POWER
✓ TX ENABLE 400ma
✓ BATTERY BACKUP
✓ 8-15v DC OPERATION
✓ SMALL SIZE 2.5" X 2.5"
NOT A KIT
$149.00 PLUS S+H

REPEATER CONTROLLER
VOICE ID'er--KE2AM VER B
SEE REVIEW OF VERSION A JUNE 1991 ISSUE OF 73 MAG.
✓ DIGITAL VOICE ID
✓ BATTERY BACKUP
✓ TIME-OUT TIMER
✓ TX HANG TIMER
✓ AUDIO MIXING
✓ ID TIMER
✓ MUTING
✓ TX ENABLE 400ma
✓ COR OR SQUELCH KEYED
✓ 8-15v DC OPERATION
✓ SMALL SIZE 3.2" X 3.4"
NOT A KIT
$119.00 PLUS S+H

Both units are fully assembled and tested. Full documentation is included. For more information, call or write.
SPECIFICATIONS AND PRICES SUBJECT TO CHANGE.
GET-TECH
201 RILEY ROAD
NEW WINDSOR, NY 12553
(914)564-5347

CIRCLE 195 ON READER SERVICE CARD

NEED HELP?
GRAB THE LINE
Call our lifeline. It's toll-free.
THE VOICE OF HOPE
1-800-572-1717
MDA Muscular Dystrophy Association

VISA MasterCard
ICOM
Listen to "Let's Talk Radio" 7 nights a week 6pm to 12 pm on Spacenet-3, Transponder-21, Audio 6.2
VHF COMMUNICATIONS
9:00 am – 5:30 pm weekdays
Weekends and evenings by appointment.
453 Buffalo Street
Jamestown, New York 14701
Western New York's finest amatuar radio dealer.
PH. (716) 664–6345
(800) 752–8813 for orders only

CIRCLE 14 ON READER SERVICE CARD

Mobile Crossband Repeater

by Murray Tucker VE6MST

Wouldn't it be nice to work your favorite 2 meter repeater with a good signal, using a handheld, from inside malls and other difficult locations? With your crossband repeating radio and a 70 cm handheld you'll be full-quieting. Those of you possessing (or thinking of obtaining) one of those newfangled dual-band VHF-UHF FM transceivers capable of crossband repeating, read on.

Let's say you're going shopping in a distant shopping mall. You want to be able to work the repeater with a handheld but never have much success from inside the mall. To extend the range of your handheld, use your dual-band mobile rig as an intermediate repeater. First, set the VHF on your crossband repeater mobile rig to the 2 meter repeater frequency and set the UHF to a simplex frequency. Next, engage the crossband repeat function. Then set the UHF handheld to the same simplex frequency as the mobile. I would recommend that CTCSS (continuous tone coded squelch system) be employed on UHF in order to prevent the mobile radio from making unwanted transmissions caused by intermod and other interference. Now you can work the repeater, on your handheld, from anywhere in the mall.

Reducing Hang Time

Most ham repeaters have a long hang time, perhaps 10 seconds. (Hang time is the time it takes the repeater carrier to drop when there are no more transmissions on the repeater.) This means that when conversing with someone, you would need to wait until the carrier from the 2 meter repeater dropped before you could reply. When the repeater is transmitting, your mobile rig is retransmitting it out on the UHF simplex frequency. During the time your mobile radio is retransmitting the repeater on UHF it won't be able to receive your transmission from the UHF handheld. As soon as the carrier from the repeater drops, the mobile rig stops retransmitting on UHF. Now the mobile can receive your transmission from the UHF handheld and retransmit it on VHF.

There are a few ways to get around the problem of having to wait a long time for the repeater to drop before you can reply. On many repeaters, the hang time can be changed remotely by DTMF (dual-tone multifrequency). Changing to a short hang time will allow you to reply almost instantly after the other person finishes their transmission.

Another way to enable instant reply capability is to have the 2 meter repeater transmit CTCSS, but only when it sees COS (carrier operated squelch). Your mobile rig should then be set up to decode the CTCSS from the 2 meter repeater. With this system, as soon as the person on the repeater stops transmitting, the CTCSS will stop as well. When the mobile rig doesn't see CTCSS anymore, the squelch closes and the radio stops retransmitting the repeater's signal out on UHF. Now the mobile can receive your transmission from the handheld.

Bypassing Repeater Limitations

The methods of operating described so far require certain facilities on the repeater, such as the ability to change the hang time or transmit CTCSS. If the repeater you want to work doesn't support these modes it is still possible to converse with someone without having to wait for the repeater to drop before replying.

For this you'll need a dual-band handheld. Set the UHF on the crossband repeater mobile rig to a simplex frequency and set the VHF to the input frequency of the 2 meter repeater that you want to work. In addition to this, engage the CTCSS decoding system on VHF but set the frequency of the CTCSS to one that is *not* being used by anyone. This way the mobile rig will not receive anything on VHF to retransmit on UHF, leaving the UHF always in the receive mode. Set the dual-band handheld to transmit on the UHF simplex frequency but set the VHF to receive the 2 meter repeater direct. The idea here is to use the mobile rig only to retransmit your signal from the handheld, but not the 2 meter repeater's signal. With this arrangement, your handheld is receiving the 2 meter repeater direct on VHF. The mobile rig is always listening for your transmissions from the handheld on UHF so you'll have instant reply capability.

There are many applications for this versatile crossband repeater system. I use it myself quite often while having coffee with other hams in restaurants where I can't reach the repeater using a handheld. This system could also be used in a public service event or emergency situation to greatly extend handheld coverage, or for temporary linking of repeaters.

I would bet there are many of you who have radios capable of crossband repeating but don't realize the potential in your equipment waiting to be unleashed. Some of the radios capable of crossband repeater operation include the Alinco DR-590T, the Kenwood TM-731A, the Yaesu FT-5200 and the ICOM IC-2410A. Once you see how easy it is to activate the crossband repeater function, I'm sure you'll be coming up with all kinds of uses for it. RF

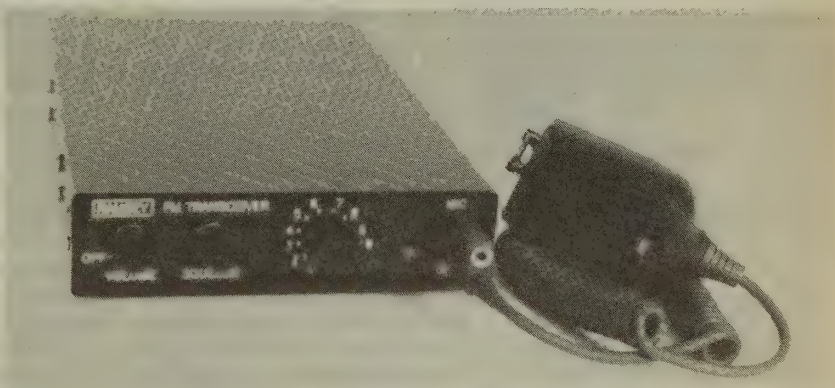
RAMSEY ELECTRONICS

PHONE ORDERS CALL
716-924-4560
FAX 716-924-4555

FANTASTIC FM TRANSCEIVER KITS!

2 meters • 223 MHz • 440 MHz
only $149.95!
$169.95 for 440 MHz

Fully Synthesized - No Crystals



Ramsey breaks the price barrier on FM rigs! The FX is ideal for shack, portable, mobile or a dedicated packet rig. Wide frequency coverage (20 MHz) and programmable repeater splits makes the FX the perfect rig for CAP, MARS or business band snooping. Packeteers really appreciate the built-in packet I/O connector, true FM signal, instant T/R switching and 9600 baud capability. You get twelve channels – easily diode programmed anywhere you want, 5 watts RF output (3-4 for FX-440), sensitive dual conversion receiver with crystal and 6 pole ceramic IF filters, plus proven easy assembly.

You build your FX in stages of a few parts at a time, logically working your way along through each section, testing your work as you build. The only test equipment you'll need is a voltmeter and another radio or frequency counter. Our 120 page instruction manual will carefully guide you to a finished unit that will work first time – and you'll learn, too! Why pay more for a used foreign-made rig when you can have an AMERICAN MADE one (by you) for less? Kit comes complete with all parts, quality epoxy PC board with printed parts layout, and extensive manual. You only need to add an ICOM/Radio Shack/Yaesu style mike and suitable enclosure. The Ramsey matching case set includes all hardware, knobs and rugged steel case (weighs 3 lbs!), with durable black powder coat finish.

Building your own rig, isn't that what ham radio is all about? Is ham radio simply buying a foreign rig we just unpack and plug-in? Let's stop sending our dollars overseas, start building, learning, experimenting and regain our technological edge.

FX-146 (2 meters)	$149.95	Still not sold? Order our FX manual and see
FX-223 (1 1/4 meters)	$149.95	for yourself! Only $10.00, refundable with
FX-440 (70 cm)	$169.95	purchase of transceiver kit.
CFX matching case set	$ 24.95	FX manual, specify band desired - $10.00

2 METER & 220 BOOSTER AMP

BOOST THE OUTPUT OF YOUR 2 METER OR 220 MHZ HT OR RAMSEY TRANSCEIVER FOR A LOT LESS THAN THOSE HIGH-PRICED AMPS!

These power boosters deliver over 30 watts of output, while a low noise preamp remarkably improves reception. Ramsey Electronics has sold thousands of these units. Get the features of those high-priced boosters at a fraction of the cost!

PA-10 2 meter, prewired (10x power gain) - $89.95

PA-20 220 MHz, prewired (8x power gain) - $89.95

YOUR SATISFACTION IS GUARANTEED. Examine your Ramsey product for 10 days. If you're not pleased, return in original condition for refund. Add $3.75 for shipping handling and insurance. Foreign orders add 20% for surface mail. COD (US only) add $5.00. Orders under $20.00 add $3.00. NY residents add 7% sales tax. Warranty: 90 days on kit parts; 1 year parts and labor on pre-wired units.

PHONE ORDERS CALL
716-924-4560 FAX 716-924-4555

RAMSEY ELECTRONICS, INC • 793 Canning Parkway • Victor, NY • 14565

CIRCLE 34 ON READER SERVICE CARD

the tech side

by Michael Jay Geier KB1UM

Packet Away!

By now, I'm sure you've heard about packet radio. You may even know someone who is using it and having a great time. Let's look at what it is and what it takes to get active on this very interesting mode.

What Is It?

Although there are various things you can do with packet, the overwhelming use for it is as a kind of computer bulletin board over the air. If you've been into computers, you're familiar with bulletin boards and you know how much fun they can be. Between chatting with other users and downloading programs, though, you sure can run up a heck of a phone bill, right? Well, with packet radio, you can have all of the fun with none of the cost! OK, sure, it costs something to get started, but not a great deal. And, using packet costs *nothing*. So, if it weans you off of the long distance telephone circuit, the equipment winds up more than paying for itself in the long run. Besides, there are things you can do with packet that you simply can't do with a landline BBS (bulletin board system), and it's a blast even if you've never used a BBS before. In fact, some hams communicate directly with each other, keyboard to keyboard. Overall, though, the BBS is the place to be!

What's In a Name?

Just why is it called packet radio anyway? The name comes from the method used to transfer data. When you're connected to a landline BBS, what you type is sent continuously as you type it. But on packet, the data is sent in spurts called "packets," each of which contains your callsign, the callsign of the packet's intended destination, and some error-correcting codes. You, of course, type only the information you want sent; the rest is automatic. If the computer on the other end receives your packet correctly, it sends back an acknowledgment code so your computer will know to send the next packet. If, however, noise or other interference has damaged your packet beyond repair, the receiving system sends back a "resend" code which instructs your computer to send the packet again and again until it receives the acknowledgment code. That part of the system is very similar to the protocols, such as XMODEM, used with regular telephone modems, but in this case it works for real-time typing as well as for file transfers. The result is error-free communication.

Another benefit of packet communication is that several stations can time-share one frequency! The way they avoid interfering with each other is by waiting until the channel is clear before transmitting, just like we do on voice. That way, the stations interleave their transmissions and, because each packet contains an address and callsign, they all wind up where they're supposed to; stations to which they are not addressed simply ignore them. Of course, if there are lots of stations on at the same time, it can slow the channel down to the point of severe user frustration. And, if they are spread so far apart that they can't hear each other directly, conflicts can still occur, causing lots of resends. Unless you live in a big city with tons of packet traffic, though, you'll find that it works pretty well.

Who Cares?

So what's the big deal, right? So you can get on a BBS for free. Ah, but packet doesn't stop there. Packet BBSs all over the world are networked into a giant system which lets you send mail and bulletins anywhere you want them to go, also for free. This is where it gets interesting. For example, I live in Tennessee, and I have a friend in California. I can connect up to my local BBS using my 2-watt walkie. Then, I can send him a letter by addressing it to his callsign, at the callsign of the BBS he normally checks into. After I post the letter on my local BBS, it will reach his BBS in a day or two by automatically bouncing from BBS to BBS in the middle of the night. It may pass through six or seven BBSs on its journey but, thanks to the error correction, it will arrive intact. When my friend is ready, he simply checks into his BBS and reads the letter. It's important to realize, though, that, like everything else on ham radio, the letter is not completely private. Although others (except for the system operators) cannot connect to the BBS and read the letter, it can be monitored by anyone while it is being sent over the air from your station and each time it is bounced to the next BBS. By the way, I actually do stay in touch with my ham friends, from California to Vermont to Scotland, via packet and it works great! The beauty of it is that we don't have to be on the air at the same time, and propagation is irrelevant.

Calling Everybody

Although plenty of "private" mail does get sent on packet, far more people use the mode to post and read bulletins. These may contain anything from political opinions (some of them pretty funny) to technical discussions to "for sale" notices for ham gear and computers. (Yup, packet is like a giant, ongoing hamfest. You'd be amazed at all the gear listed.) Such bulletins are intended for everyone to read, and they may come from far away. It is possible to address a bulletin to "all," which will make it go to every BBS in the world! As you can imagine, too much of that kind of stuff can really clutter a network up, so sysops are starting to frown on it. Still, it's done all the time. More considerate operators limit the distribution of their bulletins to their states or regions unless they really want everyone to see them.

But How?

OK, I hope I've convinced you of how interesting and fun packet radio can be. In its infancy, it was hard to find anyone to communicate with. Now, though, there are thousands of hams using it and so many BBSs that there's sure to be one near you. So what does it take to get up and running?

Not that much, really. First, of course, you need a radio! Most BBSs are on 2 meters, so you need at least a no-code Tech license; Novice won't do. If you are a Novice, start studying, because it's worth it!

Hard Or Soft?

Next you need an interface to connect the radio to your computer. In the past, there was only one choice: You had to buy a TNC, or Terminal Node Controller. That typically cost around $100 and did the work of formatting whatever you wanted to send into packets and decoding incoming packets back into data your computer could understand. Also, of course, it took care of all the acknowledgments and resends. The TNC was a complete computer on its own, relegating your desktop machine to the function of a lowly terminal. Now, however, there's a choice: You can still use a hardware TNC, or you can save some money and get a software program which makes your computer do most of the work! After all, why not use all that processing power you've already paid for?

Some Nostalgia

It all started with a program called Digicom which ran on the Commodore 64, back when that was the ham computer of choice. Written in Germany and made available for free, it soon spread around the world. With Digicom, the only hardware needed was a 1200-baud modem. Everything else was done by the computer. As you could build a modem for less than $50, it was a bargain. Many Digicom-based stations were set up and plenty are still on the air today. When the IBM-compatible machines took over, though, there was no Digicom-type program available, and many hams went back to hardware TNCs. In the last two years, that situation has changed.

Actually, most hams still use hardware TNCs, but you sure don't have to anymore. There are several packet programs out there you can get for free, and there are even commercially-built modems for around $50, so you don't have to build anything. These days, getting into packet just couldn't be easier or more affordable.

Which One?

Which one should you get? Well, if you're planning to be a sysop, or you want to get involved at the forefront of packet technology, get a hardware TNC. If, on the other hand, you just want to be able to check into bulletin boards, send and read letters and bulletins, and type at other hams, the software approach is very nice. Especially if you have a laptop, the portability and convenience of a software TNC with a tiny modem (some are built right into the connector that plugs into the computer) can't be beat. Also, some hardware TNCs generate enough RF interference that they make walkie operation with indoor antennas difficult; they trash the receiver so badly that you can't hear the station you're trying to work! Of course, your computer can do that too, but laptops don't seem to be very "noisy" that way.

Several programs which come to mind are Baycom, EZpacket and Poor Man's Packet. PMP first appeared in *73* magazine, and it has become pretty popular. I use it and I'm very happy with it. It has all the basic functions you need to get on the air and it's easy to use. Baycom includes many more advanced functions, but it is considerably harder to learn to operate. If you are going to buy a modem, make sure that it will work with the software you want to use, or be sure to get software for it, because the various programs have different wiring requirements. In particular, modems for Baycom are wired differently from those for PMP and EZpacket.

Getting Hooked

Whichever approach you decide to use, you will be left with the chore of hooking the modem or TNC up to your radio. Usually, it's easy, but sometimes you can run into problems, depending on what kind of radio you have. In particular, connecting the microphone and PTT (push to talk) wires can be a little confusing. Let's look at what you might run into:

Most mobile rigs have separate PTT lines, making them easy to connect. Walkies, however, can be quite different. Kenwood walkies have separate PTTs, but you must use a stereo mini-plug (like the kind used on portable stereo headphones). Luckily, you can get them at Radio Shack. ICOM and Yaesu walkies use a different system. There is no PTT line. Instead, these walkies sense the presence of a circuit path across the microphone line. A few kilohms of resistance across the mike line puts the rig into transmit, and an open circuit switches it back to receive. Most modems, though, let you set it up either way, so it shouldn't be a problem. In fact, I think you can buy some of them pre-wired for whichever kind of radio you own. It doesn't get much easier than that!

Once you're all hooked up, you should be able to fire it all up and connect to your local BBS in a matter of seconds. I say "should" because it never seems to work out that way. You may find that you need to play with your rig's volume control a bit before you can receive. In my experience, transmitting is always easier than receiving. The best thing you can have is a friend with a packet station, so that you can experiment until you have everything working. Then, head for the BBS and have a great time!

Well, there's plenty more to packet, but that covers the basics. See you all next time. 73 from KB1UM. RF

letters

Continued from page 5

have a side hobby of trading, buying junk and fixing it, and reselling it. I recently upgraded to a TS-430 and probably have less than $150 in it because of trading. (This is my wife's specialty. She bought an Autek QS1A for $15, which was a good deal, but by the end of the hamfest she had turned that $15 into a Hustler mobile antenna and five resonators.)

And now my second gripe and third phase of the hobby: Everyone has to have the newest and fanciest there is. If they have the slightest problem they try to solve the problem with money instead of thought. I really enjoy solving a problem by myself without dollars.

So, you see I am concerned with the way our hobby is going. I was concerned about *73* starting to go more and more away from the simple projects we need to get everyone back into the swing of being more than just operators. Seeing a copy of *Radio Fun* helped ease my concern some but please make sure to keep some in *73*.

Thank you for keeping people thinking about the progression of our hobby, and for attempting to turn some of our appliance operators into thinking, progressive hams. How about a column where people send ideas on how to beat the high cost of hamming? Keep enough of it simple enough to not scare off the timid but, rather, entice them into getting involved.

By the way, I'm not an older ham but just a 36-year-old who still believes you can have a blast in ham radio without spending a fortune. But I still have a lot to learn.

Kenn—Boy . . . I'd sure like to see your shack! I'd bet it looks like mine. Sure, I've got a modern HF rig, but most of my shack is crowded with a Drake TR-4, old Hammarlund and National receivers that "almost" work, a Heathkit HW-101, and a few kits in various stages of completion. Your kids are lucky. Their dad knows how to have fun!

Don't worry about 73. We'll always make sure that it, and Radio Fun, *are full of projects that almost anyone can build.*

Thanks for your nice letter. . . . David N1GPH RF

RF vintage review

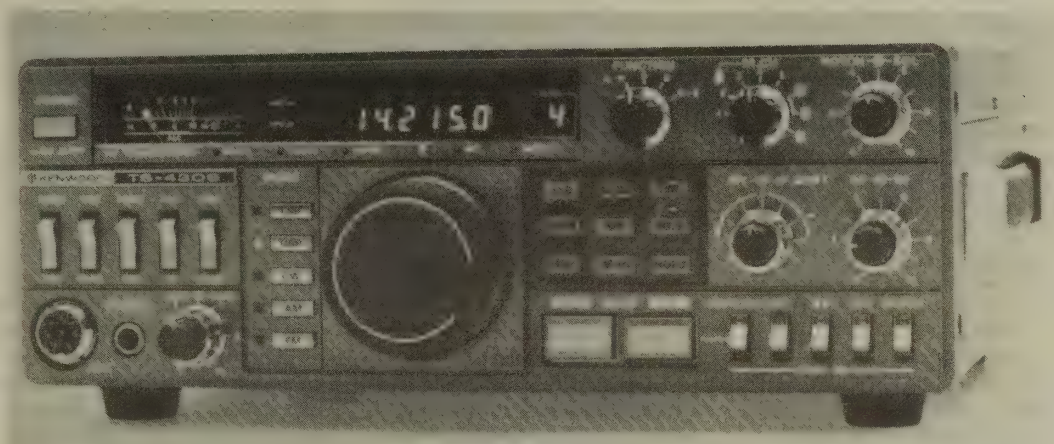
The Kenwood TS-430S

by Bill Clarke WA4BLC

Over the past several years, various solid-state HF rigs have been introduced to the ham marketplace. Some were small, some were large, and some recent units offered digital frequency readout, i-f shift, notch filtering, and even a memory frequency. Some of the rigs are only memories themselves.

This weekend I had the enjoyable use of Kenwood's most recent entry, the TS-430S. This small box is the most fascinating ham radio I have ever seen, and I have seen and worked on about all there is on the market. In addition to being a very state-of-the-art ham rig, the TS-430S is also a great SWL receiver.

The TS-430S is all solid-state, with digital frequency readout, dual VFOs, and eight continuously programmable frequencies, and that is just for starters.



The Kenwood TS-430S.

Construction

State of the art requires careful planning and engineering in the design of a reliable and easy-to-operate piece of equipment. The TS-430S is an excellent example of state of the art.

Kenwood has maintained their usual gray colors on the new unit and has, fortunately for my tired eyes, retained the blue fluorescent digital frequency readout. The front panel of the TS-430S is loaded with controls, 38 of them to be exact. But don't let all that scare you. This is a "no-tune" rig. Basically, you select the frequency and mode, set the volume and mike levels, and you are ready to go on the air. The other controls are used in selecting accessories such as the noise blanker, i-f shift, attenuator, etc. Also on the front panel is a small keyboard. This is the heart of the memory and program system. From here you can preselect frequencies and modes of operation to be later utilized at the flick of a switch.

Inside, the rig has a very clean layout with separate boards for each major functional block and plug-in wiring harnesses used between them. Space has been left for user installation of optional filters and the FM unit (FM-430). The rig appears to be a technician's dream. There is even a provision for 10 Hz readout, requiring the clipping of a wire, and WARC band usage by clipping another wire. These operations are well documented in the well-written owner's manual.

On the rear panel is a very large heat sink to cool the finals, and a fan has been installed to aid in this cooling. Unlike other solid-state rigs with fans that run during all transmissions, this fan only operates when the temperature of the heat sink exceeds 122 degrees F (50 degrees C), and then it is ultra quiet.

Operation

The operation of the TS-430S proved to be more than expected from such a small package. Most of my normal hamming is on 40 and 75 meters, so naturally I started there with the new rig. Initially, I programmed the frequencies of nets I operate on into the rig, and then with a flick of the switch I was able to move from one frequency to the next. It is interesting to note that when programming a frequency into the unit, the mode (USB, LSB, AM) is also programmed. This is nice when moving from a 20 meter net to a 40 meter net. All you have to do is flick the switch. Early in the day, on 75 meters, I set the unit to scan the memory frequencies. This allowed me to monitor activity on each of several nets. I then set the squelch (yes, I said squelch) above the noise threshold and enjoyed quiet until a net became active. I note here that each programmed frequency is scanned; however, when a busy frequency is encountered, the unit will continue to scan unless you transmit, after which it will continue to scan.

Everyone I talked with remarked about the high quality of the audio signal. All said it was great, and more than one said it "must be a Kenwood." No station was apprised of what rig I was running until after signal reports had been exchanged. One glitch I found was that when using the speech processor you must be very careful not to over-drive the unit, as distortion will result. This would no doubt vary, depending on the mike each individual uses. The only other glitch will be covered shortly.

Speaking of the speech processor, it worked quite well on DX. I found it particularly useful on 10 meters when the band was going out. Its use was the difference between QSO and no QSO.

On 40 meters SSB at night, the home of all those international broadcasting stations, I was able to enjoy easy communications; just a twist of the notch filter was needed. Herein lies the glitch. The notch filter, while very effective, is very sensitive in adjustment. I found that I was able to silence a 20 dB heterodyne and work an S9 signal. Notice I said silence, not reduce . . . silence!

I made several DX contacts on 40 meters using split frequencies. Very easy to accomplish when you have two VFOs. I also found CW operation to be quite good, and this rig had no optional filtering installed. I utilized the i-f shift and notch filter. I have not mentioned the VOX or attenuator since they are commonplace on most rigs and work well on the TS-430S.

I had a guest over one evening, and since he is an avid SWLer, I turned the controls over to him. First he programmed in the frequencies of his favorite stations, and then we memory-hopped all over the world at the flick of a switch. The sensitivity and selectivity were judged to be just short of fantastic. Surprisingly, there are no apparent shortcomings or compromises made in this versatile little rig. It is equally suitable for SWL or ham. We did, however, agree that the 6 kHz optional filter would be an asset for SWL.

I am now able to listen to Radio Australia while I have breakfast, and the now famous flick of a switch switches me to my morning net on 75 meters.

Recap

All in all, I feel that Kenwood has made the TS-430S a real winner. I am able to replace a whole deskful of equipment with this one small rig. Out goes the shortwave receiver, the tube HF rig with its external VFO and digital readout. I did not attempt mobile operation; however, I can see no reason for this unit not being tops in mobile HF operation. It can work on 10 meter FM with the installation of the FM-430. Besides, if you get tired of hamming, you could always program your favorite AM band stations into memory and at the flick of a switch listen to music or news (arghhh).

Now I think I'll make a flick of the switch and get back on 75 meters. RF

Reprinted from the June 1983 issue of 73 Amateur Radio's Technical Journal.

TS-430S Specs

Transmitter coverage	160 to 10 meters	
Receiver coverage	150 kHz to 30 MHz	
Modes	SSB, AM, CW, FM	
Size	10.6" x 3.8" x 10.8"	
Weight	14.3 lbs.	
Transmitter power	250 watts PEP	
	200 watts CW	
	60 watts AM	
Receiver sensitivity	SSB	0.25 microvolts (160-10 meters)
	AM	2.5 microvolts (160-10 meters)
	SSB	2.4 kHz at -6 dB
	AM	4.4 kHz at -60 dB
Receiver i-f rejection	More than 70 dB (ham bands)	
Receiver image ratio	More than 70 dB (ham bands)	
Power requirements	13.8V DC 1.2 amps on RX, 20 amps on TX	

SPY ON THE EARTH

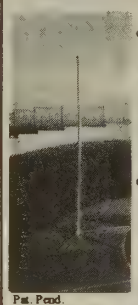
See *live* on your PC what satellites in orbit see

Learn how you can benefit greatly from this exciting new technology. Send $30 ($35 air, $40 overseas) for our *fantastic* 12 diskette set of professional quality copyrighted programs (IBM type) that does satellite tracking, data acquisition, image processing, file conversion and much more. Diskette and information package includes all programs, satellite views, C language source code for a popular satellite image acquisition program, hardware schematics, catalog and discount certificate.

VANGUARD Electronic Labs
Dept. RF, 196-23 Jamaica Ave.
Hollis, NY 11423 Tel.718-468-2720

Sell your used gear in the
Radio Fun
Flea Market
Call Judy Walker today.
1-800-274-7373

Most Revolutionary High-Frequency Amateur Radio Antennas in 20 years!
The FLYTECRAFT™ SFX Line of Monoband Vertical HF Antennas



Pat. Pend.

- 5 unique models for 40, 30, 20, 15, 10 meters. Each only 9 ft. tall (10 meter is slightly shorter)
- **Precision internal wound helix gives** full-size, incredible performance – world-wide DX or domestic.
- Praise from everywhere: ENGLAND – **"Your vertical sounds great!"** CZECH. – **"I can't believe your antenna is only 3 meters high!"**
- **Instant set-up** and tear down, or leave up permanently – unobtrusive; ideal for antenna-restricted areas. Separates down to 4 ft.
- Antennas boast **low angle radiation.**
- **Easiest-To-Use** antenna made! Uses 2 shortened radials with RADIALCOILS™ – stretch them out or coil them up. (10M uses 3)

Designed by TV's Emmy-Winning Steve Flyte, K7SF

Built with pride & sold worldwide ~ FLYTECRAFT™ USA

40 thru 15 meters ~ $99.95 ea. 10 meters ~ $89.95 ea.
Add $6.50 s/h, contin. U.S. 10% Discount on 2 or more.

Satisfaction Guaranteed
VISA/MC PHONE ORDERS
805 - 583 - 8173
Mon thru Fri 9A – 5P (PT)

Send Check/ $ Order to: FLYTECRAFT™ P.O. Box 3141 Simi Valley CA 93093

CIRCLE 118 ON READER SERVICE CARD

SUPER QRP TRANSMITTER!
It's so easy — It's ready to go!

CRYSTAL OPTIONAL

BALLOON BEACON, T-HUNTS

Completely built and tested, EXTREMELY high quality.

- **Complete** low power CW transmitter
- Up to 2-2½ watts RF output • 10-16VDC operation
- Excellent keying characteristics
- **Department of Defense** MIL-Spec. power amplifier(s)
- Compact, **rugged** and **"air ready"**
- Undergoes **stringent** assembly & inspection process
- **Superior QRP world-wide, military grade**

Just connect a battery, antenna, key and plug in your favorite crystal—that's it—**BEST GLOBAL VALUE!**

ALL Prices now include first class shipping, world-wide.
Overseas: Postal money order or U.S. correspondent bank.

SW1-30M	$30	**Options:** Dual power amplifiers—	**DPA $4**
SW1-40M	$31	Dual driver stages—	**DDS $2**
SW1-20M	$32	**Metal Case** w/RCA jacks, "air ready"—	**$11**
SW1-17M	$32	**Combat Case,** black epoxy brick, rf shield,	
SW1-15M	$33	requires special SW1—	**P.U.R.**
SW1-12M	$34	**Xtals:** 28110, 28060, 24900, 21160, 21110,	
SW1-10M	$34	21060, 18074, 14060, 10115, 10106, 7125,	
SW1-80M	$35	7110, 7040, 7030, 3710, 3700, 3560, 3535 kHz	
SW1-160M	$40		**$6.95 each**

RYAN COMMUNICATIONS
Box 111E Camelot Rd. Portersville, PA 16051, USA
(412) 368-3859

MORSE CODE MUSIC?

New-Powerful-Breakthrough, All 43 Morse Code characters sent with a rhythmic beat. A fun & easy way to learn or retain Morse Code skills. Now the secret is yours! order "THE RHYTHM OF THE CODE"™ Version II cassette today!

Send $9.95 and we'll pay the shipping to:

KAWA PRODUCTIONS
P.O. Box 319-RF.
Weymouth, MA 02188.

Check or money order only. We ship all orders within 10 days. Outside U.S.A. please add $2. for air mail. MA residents please add 5% sales tax.

CIRCLE 2 ON READER SERVICE CARD

Personal Code Explorer™

Copies FAX, RTTY, MORSE, SITOR, PACKET, and more from receiver to IBM/PC CGA, EGA, VGA screen. Easy to use and install. Extensive manual.

Personal Code Explorer also features user friendly menus, digital noise filters, global frequency lists and a FAX to GIF file converter. NOW SEE WHAT YOU'VE BEEN MISSING!

Personal Code Explorer - $129 S&H $4
Free Brochure. Call-Write-Order. MC/VISA.

Microcraft Corporation
Box 513RF, Thiensville, WI 53092
Phone (414) 241-8144

CIRCLE 98 ON READER SERVICE CARD

THE FAMED 2 METER
A. S. A. 9209

+9 db Co-Linear "MultiWave" Base Station Double 5/8 over 1/4 wave delivers up to +9 db gain. All fiberglass & solid aluminum construction. Fits masts up to 1-1/2". 2 Meter Base Station 10' length.

$32.43

+$4.00 S&H
(SC RES. 5% SALES TAX)
CHECK IN ADVANCE OR C.O.D.
ALSO AVAILABLE IN 220 & 440

ASA

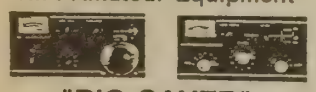
"Service is the Reason For Our Success"

Model 9209
+9db

Tel: (803)293-7888 P.O. Box 3461
Watts: 1-800-722-2681 Myrtle Beach, SC 29578

CIRCLE 18 ON READER SERVICE CARD

Townsend Electronics, Inc.
presents
C.M. Howes Kits
for
H.F. Amateur Equipment



"RIG SAVER"
H.T. and Mobil Mounts

THE WORLD'S BEST
in ham radio books and publications
28 page catalog $1.00
Outside USA $2.00
1-219-594-3661
Townsend Electronics, Inc.
Box 415R • Pierceton, IN 46562

CIRCLE 299 ON READER SERVICE CARD

Amateur Radio and the Art of Kidney Transplantation

Ham radio as therapy during a medical emergency.

by Jozef Hand-Boniakowski WB2MIC

For over five years my wife JeanneE KA1PMS and I have been struggling, wrestling with, and adopting the mind set that our young son Dylan, born on November 21, 1985, would need a kidney transplant. His only partially functioning kidney would need replacement. The transplant took place on April 25, 1991, at Boston's Childrens' Hospital. I was the donor.

Throughout the ordeal (five years plus!), ham radio played an important and vital part, providing communication between family members, keeping us in touch with club members back home, and networking (Boston, New Jersey and Vermont). Amateur radio and amateur radio operators helped build spiritual and psychological support, providing basic therapy during medical crises, and being an outlet for depression, anxiety, the need for friendship and general human contact. This is a short story, a small chapter in ham radio's potential for good, its ability to heal both physically and mentally.

A few weeks prior to the surgery I sent a packet bulletin addressed to ALL@ALLUSA requesting that emotional support, and whatever else anyone thought would help, be sent toward Boston. Hams all over the country responded. They also sent notes, cards, toys, and made phone calls.

The Long-Term Medical Emergency

JeanneE and I were prepared for a home birth. Our first child, Guinnevere KA1ZWK (now 11 years old), was born at home (a short distance from a medical center). Living now on 16 acres in rural Vermont, we prepared for our son's home birth, this time in our small home-brewed abode. It didn't turn out that way. After going into labor early, JeanneE gave birth to Dylan at a regional hospital, 25 miles to the northeast.

It was late in the evening of November 21, 1985. The contractions were 30 to 45 seconds apart. We still had over 12 miles to drive. I used the Green Mountain Wireless Society repeater (147.045 MHz) in Rutland as an open channel to cover events. Dylan was born within 15 minutes of our arrival at the hospital. It was just the beginning of our traumas and dramas.

Having pulmonary problems and other complications, Dylan was not expected to survive the night. He was transported to the Medical Center Hospital of Vermont (MCHV). MCHV is 90 miles away from our home in Wells, Vermont. His stay in intensive care lasted six weeks. Since then, Dylan has had dozens of hospital stays and has undergone hundreds of invasive procedures. For more than five years, medical surprises popped up. A routine checkup became a four-day stay for anemia, requiring blood transfusions. He spent a year with a nasogastric tube in place (for gravity caloric supplementation), was the first child in Vermont to be given erythropoetin (a recombinant DNA hormone for stimulating red cell growth), and had over a hundred X-rays and blood tests, intravenous pylograms, MRIs, CAT scans, etc., etc. Fourteen surgeries lasting from two to five-and-a-half hours became status quo.

Support from Ham Radio

The Burlington Amateur Radio Club's 146.61 repeater is a stone's throw from the hospital. JeanneE kept an ICOM Micro-2AT with her at all times. At home I used an ICOM IC-211 with a TPL commercial 500 watt output solid-state power amp (Astron 50 amp power supply) and a 15-element beam at 40 feet to communicate with her. Our home QTH is at 1,100 feet ASL. It wasn't a matter of avoiding the phone expense (over $300 that month), but knowing that any moment we could talk to each other and not have the financial burden weigh in the consideration of making or not making the call. Ham radio encouraged us to reach out to "the other" and "others." The therapeutic benefits of chatting with each other at any time gave us a psychological boost. The phone was fine for emergencies and occasional human-to-human contact, but ham radio was the intercom open at all times.

Other hams were aware of our goings-on. They offered encouragement, support and an occasional eyeball QSO. It's hard to imagine how important those surprise visits are. Let me suggest that when a club member has a hospital stay, the club either appoint someone or make arrangements for periodic visits. Nothing, short of miraculous recovery, can benefit the patient more.

I remember being flat on my back, two days after donating my left kidney. I could not yet get out of bed on my own, nor roll over. I was just beginning to recover use of my abdominal muscles and was about to have my naso-gastric tube removed. I couldn't wait. Four hundred feet away from my room, JeanneE was keeping vigil with our son, who was having a rejection episode. The phone rang. Walter O'Brien (a non-ham friend who was staying in my room helping JeanneE out full-time and now interested in ham radio) answered and handed it to me. It was Frank D'Auria N1AGY calling from Rutland, Vermont, on the 449.175 MHz WA1ZMS repeater autopatch. It was a Saturday, and the Green Mountain Society was providing communications for a walkathon. Not only did I receive greetings from Frank, I also received words of encouragement from 10 other GMWS members who had 440 MHz radios with them. As an HT was passed around, other hams took turns wishing us well. This was such a morale booster! While some hams offered comfort, others (and their spouses) planned fund raisers, and Walt WW1Q wrote a front-page story in the local newspaper about the family's ordeal.

After nine days, I was discharged from the hospital. Either JeanneE or I spent the night with Dylan in his room. He was never alone. The other stayed at the Family Inn, a special residence for transplant families in Brookline, Massachusetts. It was difficult being separated and, at times in the middle of the night, I would be in pain, still unable to roll over. At other times, one of us would have a bout with anxiety or there would be a medical "incident" during the middle of the night. JeanneE parked her u-2AT; I locked my IC-32AT onto 147.555 MHz and set the squelch a tad tight. The volume was cranked up a bit. Anytime we needed each other, we simply called. For those sound-asleep times, leaning on a touch-tone digit woke us up.

We took to walking the distance from the Family Inn to Childrens' Hospital, bearing in mind that we were in the city. I was always concerned when JeanneE made the trip alone. We tried to arrange any walking journey to be in groups. The u-2AT went mobile (pedestrian) for the 20 minutes it took to make the trek. Soon, the (temporarily) resident crowd of families (with similar circumstances) walked with JeanneE, knowing that emergency communications was always available.

I remember that during the two-week period after the transplant, when Dylan's immune system was rejecting his new kidney, JeanneE, my mother-in-law, sister-in-law (all from New Jersey) and I were in his intensive care nursery room. We were quite concerned, especially since the treatment involved the use of OKT-3, a 100% effective rejection medication that could have serious pulmonary consequences. A nurse informed us that we had visitors. We weren't expecting anyone and so it came as a surprise to see (for the first time) Rube W2LGF and his wife Vi WA2SQU.

Potential New Hams

During Dylan's 93-day stay at Childrens' Hospital (one of many), dozens of health care professionals inquired and became interested in ham radio. One in particular, Nish Bhattacharyyaa M.D. (from Darjeeling, India), immediately recognized the benefits of ham radio. Nish spent the evening prior to the surgery with me chatting about ham radio, the world situation and what can be done to improve it, Indian mysticism and techniques for calmness. His was the first face I saw after waking up from the five-and-a-half-hour surgery. Nish and his family are now in Honolulu, slowly making their way back to India over a couple of years. He plans to be a ham radio operator (VU-land) and open a pediatric surgical clinic. Other folks who were very interested in ham radio were a taxicab driver, a radiologist at Brigham and Women's Hospital, and nurses.

Now, two years after the surgery, ham radio continues to provide essential communications and therapy for us. Every few weeks, Dylan and JeanneE fly from Vermont to Logan Airport in Boston for renal clinic visits, tests and checkups. The plane service is provided by volunteer pilots in the Air Lifeline organization. We wish to thank and sing the praises of this organization (based in California). Many of the pilots are hams. I usually drop JeanneE and Dylan off at the Rutland, Vermont, airport at 6:45 a.m. She takes the IC-32AT with her. I drive south to work to Manchester, Vermont, a distance of just over 40 miles. I can communicate with JeanneE for the entire distance! We use the 145.390 MHz repeater (WA1ZMS) atop Mt. Equinox, Vermont, which has very little competition at 6,000 to 7,000 feet above sea level. By the time I'm pulling into the parking lot at the school where I teach, the plane is descending at Logan. I can carry on a QSO with her down to 2,000 feet as her plane makes the final approach.

To conclude: There has been a lot of talk lately about ham radio and its role, purpose and reason for existence. I have been a ham radio operator for over 29 years. JeanneE has been a ham for over five, and our daughter was licensed a year ago. We wouldn't leave home without it! All it takes is a little imagination and creativity to make ham radio a positive therapeutic experience, even during times of adversity. Walking around Childrens' Hospital with an HT strapped to Dylan's wheelchair while JeanneE got a break, reading in his room, added to our sense of security. Let us not forget the ability of our hobby to add enjoyment to our lives and uplift our spirits (and those of others). The only limitations of ham radio are the ones we impose. The creative use of our hobby for the good of ourselves and others is obvious once we allow our self-imposed limits to fade away.

As I write this on my 386SX notebook computer (at work, hooked up to my TNC for packet), JeanneE and Dylan are in Boston for yet another minor surgery. Tomorrow at 2 p.m. I'll listen for them on 145.39 MHZ as they fly back to the Granville, New York, airport, a one-strip runway with no radio communications (except for the two HTs between she and me)!

JeanneE, our daughter Guinnevere, our son Dylan and I wish to thank the dozens of hams who have provided assistance and support over the past seven years and continue to do so. We encourage readers to reach out using ham radio as the great healing tool that it is. RF

Confessions of a Low Power Freak

by Morgan W. Godwin W4WFL

After receiving my license, my first contact was on 80 meter CW. It was midday. My rig was a 6L6 crystal oscillator running about 25 watts input, the receiver was a modified ARC-5 (WWII vintage surplus, for you younger readers), and the antenna was a dipole about 30 feet high. The station I worked was about 300 miles away and he dropped into the noise before we could complete the contact. I never received a QSL confirming the contact, the log was lost years ago, and all I remember is that the call was W4V something or other. Nothing special, you say? True, but it set the tone for much of my future operation with my continuing interest in low power CW operation.

In the years since my first contact, at least 98 percent of my operation has been with 100 watts or less. Probably three-quarters of that has been with less than 50 watts, and at least half of that with under 25 watts. There have been times when I have had the capability to run high power, up to 600 watts or so, and it has been nice to know that it was there if needed, but it rarely was.

Why Low Power?

Just what is it about low power operation that has always appealed to me? Frankly, I haven't given it a lot of thought. I suspect that one reason is my fundamentally frugal nature. Why spend lots of money for a high power amplifier and enrich the local electric company if you don't need to? Another reason is that I enjoy doing things with low power that many people using a kilowatt or more often seem to have difficulty in doing. Subtlety and finesse can prove far more appealing and satisfying than bludgeoning your way through the competition with brute force. It's also a lot less frustrating when you fail. I'm also patient and persistent, both useful attributes if you want to be a successful and satisfied low power operator.

Efficiency should always be a top priority, regardless of how much power you use, but with low power, particularly 10 watts or less, it can be critical. Still, I continue to be surprised at how much you can get away with while using low power and still make lots of contacts. Aside from a couple of comparatively brief intervals when I have enjoyed the luxury of suburban locations with plenty of space for antennas, I have been an apartment dweller with all of the attendant limitations that imposes. Many times it has simply been impossible to put up anything resembling a proper antenna and most of the time I have resorted to end-fed random wires. Even so, I have had much good fortune with a variety of makeshift antennas.

Success in New York

Some of my most successful low power operations were carried out while I was living in New York City. At one time I lived in a brownstone building on the Upper West Side of Manhattan and had been off the air for some time. Having developed the itch to get back on the air, I cast about for equipment among my local amateur acquaintances. One friend was able to let me have a Lafayette HE-30, a small general-coverage receiver, at a bargain price. Another loaned me a crystal oscillator using a 6Y6 that ran about 3 or 4 watts input on 40 meters.

Having got that far, I was determined to put up some sort of antenna. A visit to a local shop produced a couple of rolls of hook-up wire. Splicing them together gave a total length of about 100 feet. I ran the wire out to a short pole at the end of my terrace and then up and over the roofs of several adjacent houses. Just as I was congratulating myself on having got the antenna up without incident and was climbing back onto my terrace, a young lady leaned out a window of the house next door and in a crisp English accent inquired as to what I was doing. Upon being told that I was putting up a radio antenna she responded, "Oh, you're what we call a ham in England. Good luck!"

The antenna was connected to the equipment without the benefit of any sort of matching device, switching between the receiver and transmitter being done with a small knife switch. With just one crystal I did even more listening than usual but soon discovered that I could work almost anyone I heard on or close to my operating frequency from Canada to the Carolinas, and west to Ohio. Not too bad for what had to be no more than a watt or so of output into an unmatched random wire running for most of its length along rain gutters!

The Joystick

Not all of my efforts were so successful. A year or so after the experiences related above, I was living in Midtown Manhattan in a location that made it impossible to have any sort of outdoor antenna. My answer to the problem was to obtain a Joystick and matching ATU. For those of you who have never heard of the Joystick, I'll mention that it was made in England and was about seven-and-a-half feet long, consisting of two lengths of copper tubing about an inch in diameter connected to an epoxy encapsulated coil in the middle. With rubber caps on each end, it could be conveniently leaned against the wall near the rig. A single conductor insulated wire ran from one end of the antenna to an antenna tuning unit which was connected to the antenna relay by a short length of coax. While I had had some success with the Joystick on 160 meters, I wasn't so fortunate when I tried it with a newly acquired Ten-Tec transceiver that ran a couple of watts input on 80 meter CW. The best I could do was a single cross-town contact that must have covered a distance of at least three-quarters of a mile!

The Joystick was, and still is, a much discussed and often maligned antenna. I owned two and used them regularly over a period of some 10 years. While living in central London I worked more than a hundred countries on 20 meters using 60 watts, with signal reports frequently being S9 both ways. Not bad with a seven-and-a-half-foot antenna leaning against the wall next to the rig. Many other keen low power operators used the Joystick with considerable success and I suspect that there are still a number of them being used by satisfied owners.

Non-HF Use

Of course, low power operation is not the exclusive domain of HF operators. On the frequencies above 30 MHz some extraordinary achievements have been attained by those using often extremely low power. While I have never managed to get around to trying my hand at very low power operation on the VHF/UHF bands, I have enjoyed a great deal of interesting and satisfying operation on 2 meters using 10 watts or less.

My introduction to 2 meters occurred while I was a student in Washington, D.C. During a visit to W4KFC's shack one evening, I noticed an elderly and obviously unused rig of WWII surplus origin under a table. It proved to be a much modified SCR-522 transmitter/receiver with separate power supply occupying a three-foot open relay rack. As I recall, I paid Vic something like $10 and became the proud owner of my first 2 meter rig. With about 5 watts input into a four-element beam rigged up on my balcony, I enjoyed many happy evenings chatting with the locals in the greater Washington area, and once made contact with someone in southern New Jersey. I still think that it was one of the best buys in amateur equipment that I've ever made.

More recently, I lived in a small country town near the south coast of England where I was unable to obtain planning permission to put up an antenna for the HF bands. However, I kept quite busy on 2 meters with a rig running about 10 watts to a five-element yagi indoors. While effectively blocked to the north by the South Downs, I was able to work along the coast and had an unobstructed path to the continent. Most days brought at least a couple of contacts into France, but perhaps the most interesting was one I had with F9WU on the Cherbourg peninsula. As soon as we had exchanged signal reports and names and locations, he asked if I could do him a favor. That morning he had found a dead traveller pigeon in his fireplace. There had been a storm and apparently the bird had lost its way and had fallen down the chimney and onto the hearth. There was a band on one of its legs with an identification number and the French amateur asked me to contact the British association of traveller pigeon owners and give them the number and the circumstances of the bird's death so that its owner could be informed. I conveyed the information to the association and passed their thanks to Louis the next day. You never know what your next contact will bring.

What Exactly Is QRP?

I've never been much of a joiner but I was a member of the old British-based QRP Society and one of the early members of what has since become the QRP Amateur Radio Club International. I helped to found the club's first chapter and edited its newsletter. I suppose that there will always be some disagreement as to the definition of low power (QRP). As I recall, the QRP Society asked its members to use 10 watts input or less, although an exception was made for American members who were allowed to use, I believe, 20 watts input. While I was an active member of the QRP ARC, the power limit was 100 watts input, and may still be.

To me, the currently popular definition of QRP as being 5 watts output or less seems an excellent choice. Still, it's all relative. With the maximum legal power of 150 watts input in Britain, it seems entirely reasonable that the QRP Society chose a limit of 10 watts input. And with the U.S. power limit of one kilowatt during the 1960s, it seems equally understandable that the QRP ARC should have chosen a limit of 100 watts input. It would be nice, now that the effectiveness of low power no longer appears to be in dispute, to have a single universal definition of QRP that is agreed upon by all organizations.

If I were to sum up what I believe makes a successful low power operator I would say, firstly, a reasonable measure of common sense and good judgment. Secondly, a great deal of patience and persistence. And, finally, being a good listener. If I could give only one piece of advice it would be listen, listen, listen, and then listen some more. By listening you learn the characteristics of each band, proper and effective operating procedures and techniques, and, in general, what works and what doesn't work. If you don't become a good listener you won't become a good low power operator.

During the many years that I have been licensed, low power operation mostly with what could best be described as compromise antennas has provided me with countless hours of relaxing, interesting and enjoyable activity that I wouldn't trade for all of the kilowatts and big beams in the world. However, there is one thing that both puzzles and irritates me and that I wish could be changed. More and more often I hear operators announcing that they are using low power when they call some one, especially in DX pile-ups.

As far as I can see, the shouts of "QRP, QRP" on phone and the addition of "/QRP" to callsigns on

BATTERIES

Nickel-Cadmium, Alkaline, Lithium, Sealed Lead Acid For Radios, Computers, Etc. And All Portable Equipment

YOU NEED BATTERIES? WE'VE GOT BATTERIES!

CALL US FOR FREE CATALOG

E.H.YOST & CO.
7344 TETIVA RD.
SAUK CITY, WI 53583
(608) 643-3194
FAX 608-643-4439

CIRCLE 114 ON READER SERVICE CARD

SRC-10 REPEATER/LINK CONTROLLER

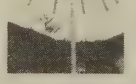
DTMF muting
Intelligent ID'er
Auxiliary outputs
Easy to interface
Alarm monitor input
Telemetry response tones
Low power CMOS, 22ma @ 12v
Detailed application manual
Programmable COS polarities
Repeater & link courtesy tones
Synthesized link/remote base capability

$149.00 Assembled & Tested

CREATIVE CONTROL PRODUCTS
3185 Bunting Avenue
Grand Junction, CO 81504
(303) 434-9405

CIRCLE 146 ON READER SERVICE CARD

The Best Scanner Use Antenna!
The FLYTECRAFT™ Model CFN
16 Element Wideband VHF/UHF Antenna



Designed by Emmy-Winning Network TV Engineer Steve Flyte, K7SF

• The Model CFN is the ultimate compact, rugged antenna for 50 to 1.3 Ghz use. (Transmit from 144 to 1.3 Ghz) • Average SWR – 1.5 across transmit range. • Amateur radio licensees operate all bands – 2M, 220, 450, 900, and 1.2 Ghz • Novices! Ideal for operation in 220 or 1.2 Ghz band for which you have privileges. • Low vertical angle radiation • Large capture area • Unity gain • Use indoors or out ~ CFN is lightweight, but tough – withstands hurricane-force winds. • Instant assembly – ideal for permanent, portable, or Field Day! • Attractive, strong design. Unique, futuristic appearance.

Built with pride & sold worldwide – FLYTECRAFT™ USA

FLYTECRAFT™ Model CFN ~ $119.95
Send Check or $ Order to: FLYTECRAFT™ P.O. Box 3141 Simi Valley CA 93093 ~ Add $5.50 s/h continental U.S.
VISA/MC PHONE ORDERS Satisfaction Guar.
805 - 583 - 8173 Mon thru Fri 9A-5P (PT)

CIRCLE 251 ON READER SERVICE CARD

MICRO HOUSE, LTD.
On Top of Technology !

Where is technology leading us? Every day, more peripherals require computer systems and components to be efficiently managed. Who do you turn to? Micro House, Ltd. of course. We have a highly trained staff, hard to get components, the newest technology, and over 12 years in business. Let us supply all your computer needs.

Complete Systems built to your Specs
Motherboards (ISA, EISA, VL Bus)
Memory Products
Hard Drive and Mass Storage
Video Imaging Products
Networking and Connectivity Products
and much more !

Send in $2.00 for a catalog (refundable).
Micro House, Ltd.
122 S. Memorial Drive
Appleton, Wisconsin 54911
(414) 731-5700

CIRCLE 297 ON READER SERVICE CARD

CW is done strictly in the hope of receiving preferential treatment just because the operators are using low power. Good grief! The pleasure and satisfaction of low power operation should come from the accomplishments one attains, without asking for or receiving any special consideration. Instead of making a contact with a desirable DX station because you announce that you are using low power, savor the far greater pleasure and satisfaction of having made the contact in head-to-head competition with all the other stations who were calling the DX.

Using low power doesn't, and shouldn't, bestow any special status on an amateur. If you can't enjoy operating with low power without seeking an advantage, get a better antenna or crank up the power to where you find the results satisfactory. Don't contribute to the impression that low power operators require an advantage to be competitive. Of course, it's an entirely different matter if you identify yourself as using low power when you are operating on the frequencies where QRP enthusiasts congregate and when seeking to contact them.

There has never been an easier or more appropriate time than now to operate with low power. There is an abundance of equipment both ready-made and in kit form, as well as construction articles in the magazines. Wider use of low power can also help to alleviate the crowding and interference on the HF bands. Why not try it? You could find it habit-forming. RF

Continued from page 8

regularly in the published bulletins, and local ham radio stores typically stock some of them. You can obtain one especially useful item, the DX-CC Countries List, from the ARRL for $2, postpaid.

DX Nets Many on-the-air DX nets operate on 20 meter SSB and on other bands. Listen to learn their schedules and procedures.

QSL Bureaus

Outgoing cards ARRL members may send most cards via ARRL headquarters. Cost is $2 per pound of cards. The ARRL DXCC Countries List, mentioned above, shows which countries the outgoing bureau handles. Private outgoing QSL services give more personalized service, but at a higher cost. Richard J. Moen N7RO, 2935 Plymouth Dr., Bellingham WA 98225, operates one. For more info, send Richard an SASE.

Incoming cards For everyone, ARRL members and non-members alike. Send number 35 self-addressed envelopes with First Class postage affixed to the incoming ARRL QSL Bureau for your district—listed in both the North America and DX *Callbooks*.

Need More Information?

Find out who the DXers are in your local ham club and make an effort to meet them. Seek out DXers at a DX convention, such as the one in Visalia, California, in April.

By Jim Maxwell W6CF. TNX ARNS Bulletin, Volume XLII No. 2, February 1993.

"Restore Hope" Revives Ham Radio in Somalia

Ham radio is again on the air from Somalia, but it is primarily foreigners who are operating the stations. One of these is Robin Critchell WA6CDR, a broadcast engineer with CBS. Critchell, operating as T55C, is one of the founders of the famed western United States Cactus Radio Network ham radio intertie. He says that he plans to operate mainly CW whenever time will allow. Robin notes that he may have to go QRT suddenly on occasion, as his work takes priority.

WA6CDR will stay in Somalia until CBS News leaves the area and will QSL after he returns home. All cards go to his *Callbook* address.

Another station, signing T5CB, has been worked on 10, 15 and 20 meters. Other T5 stations associated with Operation Restore Hope are expected on the air soon. *TNX Newsline; Westlink Report #641, January 14, 1993.*

Major License Delay

The FCC has told volunteer examiners to advise those taking amateur exams to expect to have to wait four months or longer for a license to be issued. According to the Commission, the time between a person's passing an examination and his receiving a license is currently 120 days from the date of the test. Year-end staff shortages at the Commission's Special Services Branch are cited as the cause of the recently increased processing times.

The Commission also says that applicants waiting for their tickets are not to inquire on the status of an application until it has been pending more than 90 days. The FCC says efforts are continuing to reduce this waiting period but makes no promises as to when the processing time will be narrowed. Currently, the FCC is reportedly receiving about 7,500 Amateur Service applications every month. *TNX Westlink Report #641, January 14, 1993.*

What's ECAT?

East Coast Amateur Television, Inc. is a non-profit organization dedicated to the enhancement of Amateur Television Communications. ECAT operates one fast-scan ATV repeater from Boston Hill in North Andover, Massachusetts. This repeater has an input on 434.00 MHz and an output on 421.25 MHz. Members can access various functions on the repeater via the link with the 2 meter repeater. The ECAT 2 meter repeater is not only linked to ATV, but also sports a full-duplex autopatch which is open to all ECAT members. This repeater has an input on 144.690 MHz and an output on 145.290 MHz. Occasionally, band conditions warrant the use of a PL tone of 167.9 Hz for access. The tone is always on the output to keep from receiving the Connecticut repeater. ECAT also has access to a 440 repeater at the same site. This repeater has an input on 442.375 and an output on 447.375, and is tone accessible with a PL tone of 88.5. As of yet, this repeater is not linked to the others, but will be soon. Anyone with an interest in amateur television can become a member of ECAT by remitting $20 ($30 for family membership) to ECAT, P.O. Box 669, Melrose MA 02176.

TNX The Video Communicaster.

Q : What Keeps You *Twistin'* when the lights go out?

A : The EMOTO 201SAX and 201AAX Rotators!

Professional grade, high performance rotators with one major difference: They both run on 12 volts DC!

The 201 series rotators offer all the features and ruggedness you've come to expect from EMOTO:
- Attractive, easy-to-read 360° circle controller on the standard 201 SAX home station version
- Specially designed compact controller, perfect for outdoor field day, DX-pedition and VHF/UHF mountaintopping on the 201AAX portable version.
- Both models feature a conservative 8 square foot rating and handle most popular 3 element tri-band beams, even full-sized VHF/UHF antenna farms.

This unique product is the logical solution for all ARES/RACES, Skywarn and other emergency stations looking for the ultimate in disaster communications preparedness!

With the EMOTO 201 series rotators, you'll never have to be without your beams 'cause the lights went out!

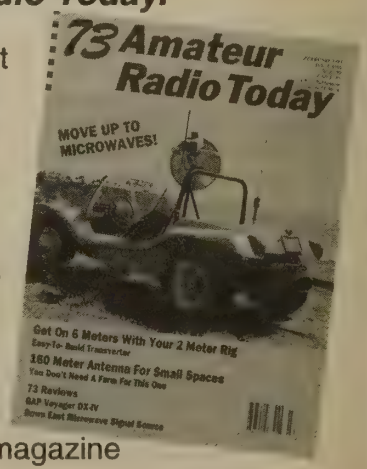
EDCO
Electronic Distributors Corporation
325 Mill Street Vienna VA 22180
Ph 703-938-8105 FAX 703-938-6911
Contact Your Favorite Dealer Today!
EDCO

Sell your Product in *RADIO FUN* Call Dan Harper TODAY! 1-800-274-7373

73 Amateur Radio Today

PUT SOME EXCITEMENT INTO YOUR HOBBY!!

No other magazine brings you the exciting world of amateur radio like ***73 Amateur Radio Today.***


73 Amateur Radio Today
MOVE UP TO MICROWAVES!
Get On 6 Meters With Your 2 Meter Rig
160 Meter Antenna For Small Spaces
73 Reviews

- Construction projects: The most homebrew projects *anywhere.*
- Product Reviews: Belly-to belly matchup of new gear.
- ATV: Find out about amateur television.
- HAMSATS: Get the latest news on amateur satellite.
- Never Say Die: And you bet I won't.
- 73 International: ***73 Amateur Radio Today*** is the only ham magazine with monthly news from every corner of the world.

12 issues for **$19.97**
That's a **43%** savings off the newsstand price!
CALL 1-800-289-0388
or send $19.97 to: ***73 Amateur Radio Today***
70 Rte. 202N, Peterborough, NH 03458

DON'T MISS OUT!

SUBSCRIBE TO

Radio Fun

FOR ONLY $12.97!

12 GREAT ISSUES!

e Now! 12 issues for $12.97.

Fun for the low price of $12.97.

In New Hampshire, call 603-924-0058).

nt) Call

Zip

nt enclosed

T Subscriber___CQ Subscriber___

. Basic subscription rate $14.97. 05S

CONTACT YOUR ADVERTISERS EASILY!

FILL OUT THIS FREE READER SERVICE CARD AND SEND IT TODAY!

R SERVICE CARD

March 1993

CARD VALID UNTIL 4/30/93

	9	10	201	202	203	204	205	206	207	208	209	210
	19	20	211	212	213	214	215	216	217	218	219	220
	29	30	221	222	223	224	225	226	227	228	229	230
	39	40	231	232	233	234	235	236	237	238	239	240
	49	50	241	242	243	244	245	246	247	248	249	250
	59	60	251	252	253	254	255	256	257	258	259	260
	69	70	261	262	263	264	265	266	267	268	269	270
	79	80	271	272	273	274	275	276	277	278	279	280
	89	90	281	282	283	284	285	286	287	288	289	290
	99	100	291	292	293	294	295	296	297	298	299	300
	109	110	301	302	303	304	305	306	307	308	309	310
	119	120	311	312	313	314	315	316	317	318	319	320
	129	130	321	322	323	324	325	326	327	328	329	330
	139	140	331	332	333	334	335	336	337	338	339	340
	149	150	341	342	343	344	345	346	347	348	349	350
	159	160	351	352	353	354	355	356	357	358	359	360
	169	170	361	362	363	364	365	366	367	368	369	370
	179	180	371	372	373	374	375	376	377	378	379	380
	189	190	381	382	383	384	385	386	387	388	389	390
	199	200	391	392	393	394	395	396	397	398	399	400

RMATION

05V

sed in this issue of Radio Fun circle
Offer valid in the U.S. and possessions only.

NO OTHER MAGAZINE BRINGS YOU THE EXCITING WORLD OF AMATEUR RADIO LIKE

73 Amateur Radio Today

12 ISSUES ONLY $19.97!

dio Today.

of *73* for the low price of $19.97!
rice). Mail this postage paid card
free: 800-289-0388 (In Colorado,

(please print) Call

State Zip

❒ Bill me
❒ Visa ❒ Amex

Exp. date

subscription rate $24.97 (Canadian orders GST; other foreign countries add $19.00 per er year for airmail. Please allow 4-6 weeks 4QCE5

CW is done strictly in the hope of receiving preferential treatment just because the operators are using low power. Good grief! The pleasure and satisfaction of low power operation should come from the accomplishments one attains, without asking for or receiving any special consideration. Instead of making a contact with a desirable DX station because you announce that you are using low power, savor the far greater pleasure and satisfaction of having made the contact in head-to-head competition with all the other stations who were calling the DX.

Using low power doesn't, and shouldn't, bestow any special status on an amateur. If you can't enjoy operating with low power without seeking an advantage, get a better antenna or crank up the power to where you find the results satisfactory. Don't contribute to the impression that low power operators require an advantage to be competitive. Of course, it's an entirely different matter if you identify yourself as using low power when you are operating on the frequencies where QRP enthusiasts congregate and when seeking to contact them.

There has never been an easier or more appropriate time than now to operate with low power. There is an abundance of equipment both ready-made and in kit form, as well as construction articles in the magazines. Wider use of low power can also help to alleviate the crowding and interference on the HF bands. Why not try it? You could find it habit-forming. RF

Continued from page 8

regularly in the published bulletins, and local ham radio stores typically stock some of them. You can obtain one especially useful item, the DX-CC Countries List, from the ARRL for $2, postpaid.

DX Nets Many on-the-air DX nets operate on 20 meter SSB and on other bands. Listen to learn their schedules and procedures.

QSL Bureaus

Outgoing cards ARRL members may send most cards via ARRL headquarters. Cost is $2 per pound of cards. The ARRL DXCC Countries List, mentioned above, shows which countries the outgoing bureau handles. Private outgoing QSL services give more personalized service, but at a higher cost. Richard J. Moen N7RO, 2935 Plymouth Dr., Bellingham WA 98225, operates one. For more info, send Richard an SASE.

Incoming cards For everyone, ARRL members and non-members alike. Send number 35 self-addressed envelopes with First Class postage affixed to the incoming ARRL QSL Bureau for your district—listed in both the North America and DX *Callbooks*.

Need More Information?

Find out who the DXers are in your local ham club and make an effort to meet them. Seek out DXers at a DX convention, such as the one in Visalia, California, in April.

By Jim Maxwell W6CF. TNX ARNS Bulletin, Volume XLII No. 2, February 1993.

"Restore Hope" Revives Ham Radio in Somalia

Ham radio is again on the air from Somalia, but it is primarily foreigners who are operating the stations. One of these is Robin Critchell WA6CDR, a broadcast engineer with CBS. Critchell, operating as T55C, is one of the founders of the famed western United States Cactus Radio Network ham radio intertie. He says that he plans to operate mainly CW whenever time will allow. Robin notes that he may have to go QRT suddenly on occasion, as his work takes priority.

WA6CDR will stay in Somalia until CBS News leaves the area and will QSL after he returns home. All cards go to his *Callbook* address.

Another station, signing T5CB, has been worked on 10, 15 and 20 meters. Other T5 stations associated with Operation Restore Hope are expected on the air soon. *TNX Newsline; Westlink Report #641, January 14, 1993.*

Major License Delay

The FCC has told volunteer examiners to advise those taking amateur exams to expect to have to wait four months or longer for a license to be issued. According to the Commission, the time between a person's passing an examination and his receiving a license is currently 120 days from the date of the test. Year-end staff shortages at the Commission's Special Services Branch are cited as the cause of the recently increased processing times.

The Commission also says that applicants waiting for their tickets are not to inquire on the status of an application until it has been pending more than 90 days. The FCC says efforts are continuing to reduce this waiting period but makes no promises as to when the processing time will be narrowed. Currently, the FCC is reportedly receiving about 7,500 Amateur Service applications every month. *TNX Westlink Report #641, January 14, 1993.*

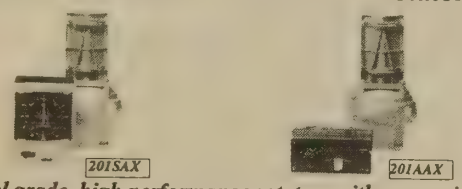
What's ECAT?

East Coast Amateur Television, Inc. is a non-profit organization dedicated to the enhancement of Amateur Television Communications. ECAT operates one fast-scan ATV repeater from Boston Hill in North Andover, Massachusetts. This repeater has an input on 434.00 MHz and an output on 421.25 MHz. Members can access various functions on the repeater via the link with the 2 meter repeater. The ECAT 2 meter repeater is not only linked to ATV, but also sports a full-duplex autopatch which is open to all ECAT members. This repeater has an input on 144.690 MHz and an output on 145.290 MHz. Occasionally, band conditions warrant the use of a PL tone of 167.9 Hz for access. The tone is always on the output to keep from receiving the Connecticut repeater. ECAT also has access to a 440 repeater at the same site. This repeater has an input on 442.375 and an output on 447.375, and is tone accessible with a PL tone of 88.5. As of yet, this repeater is not linked to the others, but will be soon. Anyone with an interest in amateur television can become a member of ECAT by remitting $20 ($30 for family membership) to ECAT, P.O. Box 669, Melrose MA 02176.

TNX The Video Communicaster.

Q : What Keeps You *Twistin'* when the lights go out?

A : The EMOTO 201SAX and 201AAX Rotators!



Professional grade, high performance rotators with one major difference: They both run on 12 volts DC!

The 201 series rotators offer all the features and ruggedness you've come to expect from EMOTO:
- Attractive, easy-to-read 360° circle controller on the standard 201 SAX home station version
- Specially designed compact controller, perfect for outdoor field day, DX-pedition and VHF/UHF mountaintopping on the 201AAX portable version.
- Both models feature a conservative 8 square foot rating and handle most popular 3 element tri-band beams, even full-sized VHF/UHF antenna farms.

This unique product is the logical solution for all ARES/RACES, Skywarn and other emergency stations looking for the ultimate in disaster communications preparedness!

With the EMOTO 201 series rotators, you'll never have to be without your beams 'cause the lights went out!

EDCO Electronic Distributors Corporation
325 Mill Street Vienna VA 22180
Ph 703-938-8105 FAX 703-938-6911
Contact Your Favorite Dealer Today!

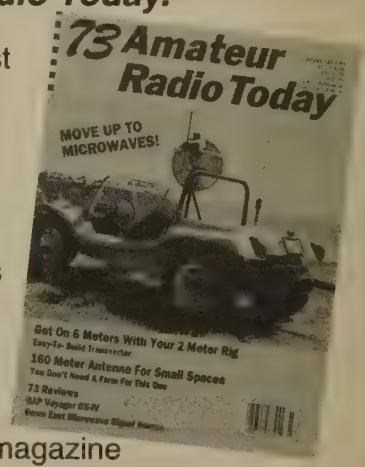
Sell your Product in *RADIO FUN* Call Dan Harper TODAY! 1-800-274-7373

73 Amateur Radio Today

PUT SOME EXCITEMENT INTO YOUR HOBBY!!

No other magazine brings you the exciting world of amateur radio like ***73 Amateur Radio Today.***

- Construction projects: The most homebrew projects *anywhere.*
- Product Reviews: Belly-to belly matchup of new gear.
- ATV: Find out about amateur television.
- HAMSATS: Get the latest news on amateur satellite.
- Never Say Die: And you bet I won't.
- 73 International: ***73 Amateur Radio Today*** is the only ham magazine with monthly news from every corner of the world.


73 Amateur Radio Today
MOVE UP TO MICROWAVES!
Get On 6 Meters With Your 2 Meter Rig
160 Meter Antenna For Small Spaces
73 Reviews

12 issues for **$19.97**
That's a **43%** savings off the newsstand price!
CALL 1-800-289-0388
or send $19.97 to: ***73 Amateur Radio Today***
70 Rte. 202N, Peterborough, NH 03458

DON'T MISS OUT!
SUBSCRIBE TO
Radio Fun
FOR ONLY $12.97!

12 GREAT ISSUES!

CONTACT YOUR
ADVERTISERS
EASILY!

FILL OUT THIS
FREE
READER SERVICE CARD
AND SEND IT TODAY!

NO OTHER
MAGAZINE BRINGS
YOU THE EXCITING
WORLD OF
AMATEUR RADIO
LIKE

73 Amateur
Radio Today

2 ISSUES ONLY $19.97!

DON'T MISS OUT!
SUBSCRIBE TO
Radio Fun
FOR ONLY $12.97!

12 GREAT ISSUES!

CONTACT YOUR
ADVERTISERS
EASILY!

FILL OUT THIS
FREE
READER SERVICE CARD
AND SEND IT TODAY!

NO OTHER MAGAZINE BRINGS YOU THE EXCITING WORLD OF AMATEUR RADIO LIKE

73 Amateur Radio Today

12 ISSUES ONLY $19.97!

Radio Fun

Subscribe Now! 12 issues for $12.97.

__**YES!** Send me one year (12 issues) of Radio Fun for the low price of $12.97.

For instant service call toll free **1-800-257-2346**. (In New Hampshire, call 603-924-0058).

Name (please print) Call

Address

City State Zip

Charge my: ❒ MC ❒ Visa ❒ Payment enclosed

Card Number Exp. date

Class License_____Year Licensed___ 73 Subscriber___QST Subscriber___CQ Subscriber___

Canada add $8. Foreign add $12 surface, $36 airmail. Newstand rate $24. Basic subscription rate $14.97. 05S

Radio Fun

READER SERVICE CARD

March 1993

THIS CARD VALID UNTIL 4/30/93

NAME CALL

ADDRESS

CITY STATE ZIP

Where did you get this copy of Radio Fun?

A ❒ Newsstand B ❒ Subscription

1	2	3	4	5	6	7	8	9	10	201	202	203	204	205	206	207	208	209	210
11	12	13	14	15	16	17	18	19	20	211	212	213	214	215	216	217	218	219	220
21	22	23	24	25	26	27	28	29	30	221	222	223	224	225	226	227	228	229	230
31	32	33	34	35	36	37	38	39	40	231	232	233	234	235	236	237	238	239	240
41	42	43	44	45	46	47	48	49	50	241	242	243	244	245	246	247	248	249	250
51	52	53	54	55	56	57	58	59	60	251	252	253	254	255	256	257	258	259	260
61	62	63	64	65	66	67	68	69	70	261	262	263	264	265	266	267	268	269	270
71	72	73	74	75	76	77	78	79	80	271	272	273	274	275	276	277	278	279	280
81	82	83	84	85	86	87	88	89	90	281	282	283	284	285	286	287	288	289	290
91	92	93	94	95	96	97	98	99	100	291	292	293	294	295	296	297	298	299	300
101	102	103	104	105	106	107	108	109	110	301	302	303	304	305	306	307	308	309	310
111	112	113	114	115	116	117	118	119	120	311	312	313	314	315	316	317	318	319	320
121	122	123	124	125	126	127	128	129	130	321	322	323	324	325	326	327	328	329	330
131	132	133	134	135	136	137	138	139	140	331	332	333	334	335	336	337	338	339	340
141	142	143	144	145	146	147	148	149	150	341	342	343	344	345	346	347	348	349	350
151	152	153	154	155	156	157	158	159	160	351	352	353	354	355	356	357	358	359	360
161	162	163	164	165	166	167	168	169	170	361	362	363	364	365	366	367	368	369	370
171	172	173	174	175	176	177	178	179	180	371	372	373	374	375	376	377	378	379	380
181	182	183	184	185	186	187	188	189	190	381	382	383	384	385	386	387	388	389	390
191	192	193	194	195	196	197	198	199	200	391	392	393	394	395	396	397	398	399	400

FREE PRODUCT INFORMATION

05V

Reader Service: To receive more information on the products advertised in this issue of Radio Fun circle appropriate number. Please allow 6 weeks for processing of inquiry. Offer valid in the U.S. and possessions only.

❒YES! I want to grow with *73 Amateur Radio Today.*

Send me 1 year (12 issues in all) of *73* for the low price of $19.97! (Save over $15.00 off the cover price). Mail this postage paid card today. For instant service call toll free: 800-289-0388 (In Colorado, call 303-447-9330).

Name (please print) Call

Address

City State Zip

❒ **Payment enclosed** ❒ **Bill me**

Charge my: ❒ **MC** ❒ **Visa** ❒ **Amex**

Card Number Exp. date

Newsstand rate $35.40. Basic subscription rate $24.97 (Canadian orders add $7.00 per year plus $1.40 GST; other foreign countries add $19.00 per year for surface mail, $42.00 per year for airmail. Please allow 4-6 weeks for delivery of first issue. 4QCE5

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 211 MANCHESTER NH

POSTAGE WILL BE PAID BY ADDRESSEE

Radio Fun

PO Box 4926
Manchester NH 03108-9839

Place
Stamp
Here

Radio Fun

READER SERVICE MANAGEMENT DEPARTMENT
PO BOX 8708
BOULDER CO 80329-8708

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST-CLASS MAIL PERMIT NO. 1199 BOULDER CO

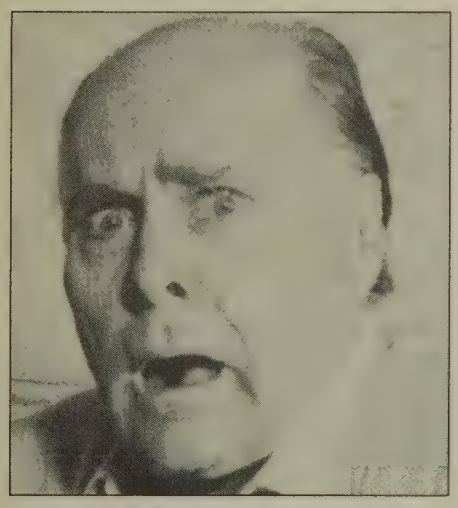
POSTAGE WILL BE PAID BY ADDRESSEE

73 Amateur Radio Today
P.O. BOX 50330
BOULDER CO 80321-0330

advertiser index

RS#	ADVERTISER	PG
18	A.S.A.	14
•	Advanced Electronic Applications	CV2
90	Antennas West	24
16	Astron Corporation	7
17	ATV World	25
92	Azden Corporation	CV4
105	Battery Tech, Inc.	9
146	Creative Control Products	15
•	Davilyn Corporation	23
•	Dayton Hamvention	3
•	Douglas RF Devices	18
114	E. H. Yost	15
157	Echotrak	20
•	Electronic Distributors	16
118	Flytecraft	13
251	Flytecraft	15
195	Get-Tech	10
193	GGTE	21
•	Greater Baltimore Hamboree	9
182	Handie-Base	24
55	J•Com	20
240	Jan Crystals	18
148	JLP Computers & Electronics	20
2	Kawa Productions	14
234	Lentini Communications	9
101	Maxcom, Inc.	17
86	MFJ Enterprises	5
297	Micro House	15
98	Microcraft Corporation	14
114	Mr. Nicad	15
•	Oklahoma Comm Center	21
152	PacComm	4
68	Periphex	25
132	Quement Electronics	27
110	Radio Amateur Satellite	25
153	Radio City	19
•	Radio Fun	17
34	Ramsey Electronics	11
171	RF Enterprises	20
•	Ryan Communications	13
153	Satellite City	19
•	73 Amateur Radio Today	16
35	Sign On	19
244	Software Systems	9
250	Software Systems	21
269	Tigertronics	26
299	Townsend Electronics	14
11	Transel Technologies	24
•	Uncle Wayne's Bookshelf	29
136	Unadilla Antenna Manufacturing Company	25
•	Universal Radio	21
•	Vanguard Labs	13
14	VHF Communications	10
104	Vis Study Guides, Inc.	20
•	Yaesu Electronics Corporation	CV3

What are you . . . nuts?



Our founder, Wayne Green W2NSD, upon hearing that you were not yet subscribing to *Radio Fun*.

I'm shocked! I'm outraged! I'm beside myself and I'm flabbergasted!

You mean to tell me that *Radio Fun* has been around for a whole year, and you *still* haven't subscribed?

Even though you're aware that *Radio Fun* is the *only* amateur radio magazine devoted to the newcomer? Even though we pack every issue of *Radio Fun* with easy construction projects, interesting news, great reviews of new and vintage gear . . . not to mention our columnists, who are devoted to helping you learn more about, and have more fun with, amateur radio?

OK. We'll just forget your past indiscretions and start fresh. We'll send you 12 issues of *Radio Fun* for the amazingly generous price of $12.97. Hey . . . that's almost 1/2 off the cover price! Just use the convenient postcard attached to the center of this magazine, or you can call toll free, 1-800-257-2346, and charge your subscription. Either way, let's get this taken care of.

1 year of *Radio Fun* for only $12.97! Call 1-800-257-2346.

MAXCOM®

"The ONLY, Absolutely, Completely, Fully, No Adjustment, Install It, Forget It, Works Even in Receive, All Frequency, Tougher than Lightning, Works Forever, Waterproof, Automatic Antenna Matcher"!!!

OVER 7,000 MAXCOM® STATIONS WORLDWIDE
THE BOTTOM LINE: "MAXCOM® WORKS".

P.O. Box 502
Fort Lauderdale • Florida 33302
Phone: 305-523-6369 • Fax: 305-522-8159

CIRCLE 101 ON READER SERVICE CARD

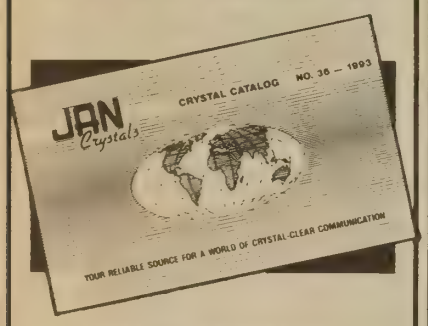
Test Gear

Finest quality test gear from names like: HP, Tektronics, Fluke, Sencore and many more!

Send S.A.S.E. for current list to:
Douglas RF Devices
P.O. Box 246925
Sacramento, CA 95824-6925

Radios & Antennas Too!

FREE 1993 CATALOG



SAVE MONEY-HIGH QUALITY, FAST DELIVERY

General Communication
Industry
Marine VHF • Scanners
Amateur Bands
Microprocessor

CALL TOLL FREE: 1-800-JAN-XTAL

JAN Crystals

P.O. BOX 06017 • Fort Myers, Florida 33906
(813) 936-2397

CIRCLE 240 ON READER SERVICE CARD

What Else Can You Hear on Your 2 Meter Rig?

by Paul Danzer N1II

Here you are, with a nice new 2 meter rig. No one is on the repeater—so what do you do now? Perhaps this is the time to explore the "extended frequency range" that came on your rig.

Many, if not most, of the new 2 meter handie-talkies and mobile rigs now have the ability to receive in the band of frequencies just outside the amateur 144-148 MHz band. Alinco, Azden, ICOM, Kenwood, Yaesu, and others offer this ability. Some require what the manufacturer calls "minor modifications" to cover the extra frequencies, and others come ready to dial in the extra frequencies without change.

It may be a little difficult at first to understand what you are hearing on these frequencies so let's take a little tour. For example, suppose you are driving down the road and hear: "One Big Mac, one shake, one small fries." Sounds like McDonald's—and it is. They use one of the low power business frequencies for placing orders from the drive-in window to the kitchen. Just listen on 154.57, 154.60, or 151.625. But remember that the range of their transmitters is only a few thousand feet.

The View From the Top

We'll start our tour with the chart shown in Figure 1. The high frequencies, including the HF ham bands, are shown between 1.8 and 30 MHz. The VHF bands, including 6 and 2 meters, occupy the space between 30 and 300 MHz. Ultra High Frequency (UHF) bands start at 300 MHz.

With extended coverage on a 2 meter rig the frequencies that can be received are those adjacent to the ham band at 144 to 148 MHz.

Figure 2 shows in a little more detail these surrounding frequencies. Notice that the drawing does not show clear, wide bands for various services between 148 and 172 MHz. The bands in this region are small and intermixed. Sometimes you have to listen to a transmission to figure out what service is using the frequency.

Below 2 Meters—The Aircraft Band

Some ham 2 meter rigs are able to receive the aircraft band at 118 to 138 MHz. These transmissions use amplitude modulation (AM) rather than the frequency modulation (FM), but many of today's 2 meter rigs include circuitry for AM reception on this band.

The aircraft band starts at 108 MHz, but below 118 MHz there are primarily navigation beacons. If you are within 50 miles of an airport you should receive communications from both the ground station and the aircraft. Beyond this range you probably will get just the aircraft side of the conversation.

Expect to hear expressions such as: "American 27 heavy, maintain flight level two five zero, speed 300 knots or less."; " Contact Boston Center on one three four. Good evening."; "Boston this is BisEx 2671 and I have Charlie."

That last expression tells the ground control that this pilot has monitored a broadcast from a system known as ATIS (Automated Terminal Information System). Each broadcast, which provides continuous weather and airport conditions, is assigned a letter to indicate which broadcast was heard.

If you live close to an airport you will probably be able to pick up these continuous reports. They provide a good source of frequently updated weather conditions. Unfortunately for us, although not for the pilots and passengers, these ATIS broadcasts are directed mostly skyward so don't be surprised if their signals are relatively weak, even at fairly short ranges.

Simplex, Repeaters and Duplex

Above the 2 meter band most of the services use narrowband FM, just as we do. Figure 3 shows how the frequencies are used. When you tell a friend to meet you on 146.52, you are operating simplex. Each of you transmits and receives on the same frequency, and only one of you transmits at a time.

For some of the business bands, repeater operation is the same as we use on 2 meters. The mobile station transmits on one frequency, and it is broadcast to another mobile on a second frequency. These repeaters are run by a commercial communications service and businesses subscribe to (and pay) to use these commercial repeaters.

A not-too-common arrangement, found mostly in the marine band, is duplex and semi-duplex. Here the ship transmits on one frequency and the shore station transmits on a second. Although the shore station, usually run by a telephone company, may be able to transmit and receive at the same time, most private boats can usually only transmit or receive—but not simultaneously. Ships able to receive and transmit simultaneously are said to be working duplex, just like an ordinary telephone. That is why some of these channels have different frequencies assigned for the shore station transmitter and for the transmitter on the ship.

Marine Radio

A very popular set of frequencies you can monitor, assuming you live near the seacoast or near a large river or lake, is the marine channels. On weekends some of these frequencies are so crowded that they make the ham bands look empty by comparison. Near major waterways you can hear the Coast Guard handling several emergencies at once. Coordinated aircraft and Coast Guard ship search and rescue activities are all too common.

The information in the sidebar has been extracted from the latest edition of the code of federal regulations. If you want to be very exact, it is from a book titled *Title 47, Telecommunications, Part 80, Stations in the Maritime Service*. Just as hams are regulated by law (Part 97 applies to us), each radio service is controlled by a section in this book of regulations.

The use and frequency of each of these marine "channels" is given in the sidebar. Channel 16 on 156.8 MHz is the most important safety-calling frequency. Much Coast Guard activity is on channel 22, and weekend random chatter is supposed to be confined to the channels labeled "noncommercial."

Associated with these channels are the continuous weather broadcasts. Originally meant for marine interests only, they are now found throughout the country on 162.400, 162.475, and 162.55 MHz.

Telephones and Paging Systems

Down in the low 150 MHz region you can hear sets of tones—normally repeated only once or twice. These are the small belt-mounted pagers which are so common these days. Call someone's paging service and he or she will hear their pager squawk when their assigned tones are transmitted.

Mixed in here are the remnants of the old mobile telephone service. Once it was all we had, back in the pre-cellular phone days. It operated very similarly to an automated autopatch, with service both ways. Those still in use today can be heard transmitting ringing sounds, busy signals, and voice conversations. This service was (and still is) very limited since there were generally about 12 channels assigned. If you lived in a major city this meant that they could only allow 12 calls at the same time for the entire city!

Low Power Business Band

The three frequencies discussed earlier (154.57, 154.6, and 151.625) are used not only by McDonald's but also by many businesses. When you see a surveying party working near a new road or development, the small handie-talkies they use are on one of these three frequencies. If you are mobile near a construction site where a large crane is in use you can hear these small radios. To some extent, they have supplanted the hand signals the ground man used to give the crane operator.

Since these units are limited in power they are licensed (or perhaps more in theory than in fact) by filing a written application and paying a fee. In a metropolitan area you can hear several users at once. As one transmitter goes off, often a second, weaker signal can be heard. There is surprisingly little interference since they are used over short ranges, and due to what we know as the "FM capture effect" the strongest signal captures the receiver. In this case, since all of the transmitters are approximately of the same power, the strongest signal usually comes from the closest unit.

These frequencies are also favorites for sports events. Discussions between ball team coaches or between pit crews and racing cars are often found here. Next time you go to one of these events take your handie with you.

Police, Fire and Ambulance

Eventually we had to get around to these services. Yes, they're here, and if you stumble on one of the active police frequencies you might hear them working a radar trap. For the most part these services are being phased out and replaced by cellular type systems in the 800 MHz band.

The fire department frequencies can be very confusing. Since, of necessity, communications must be carried out dependably within buildings, some fire trucks have their own repeaters. These are triggered by the small radios carried by fire department per-

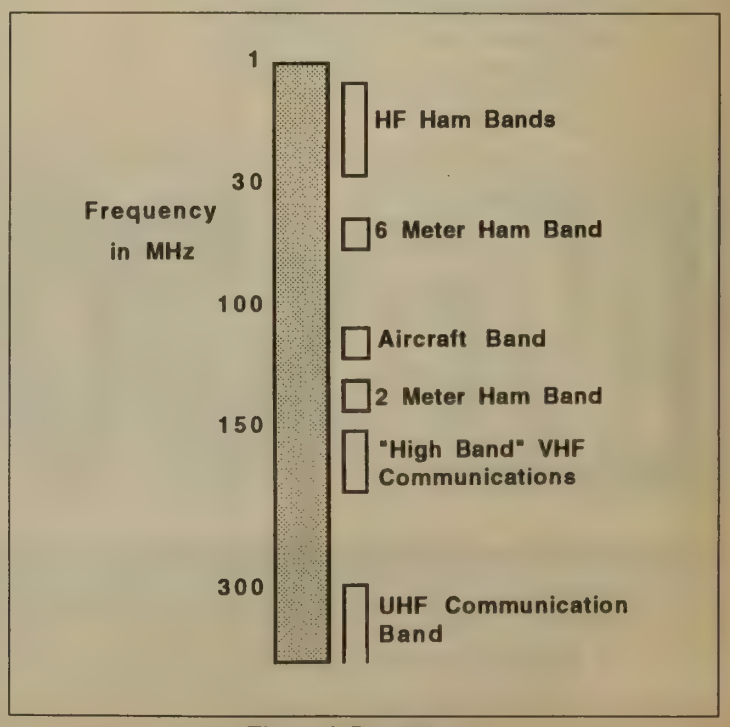


Figure 1. Band chart.

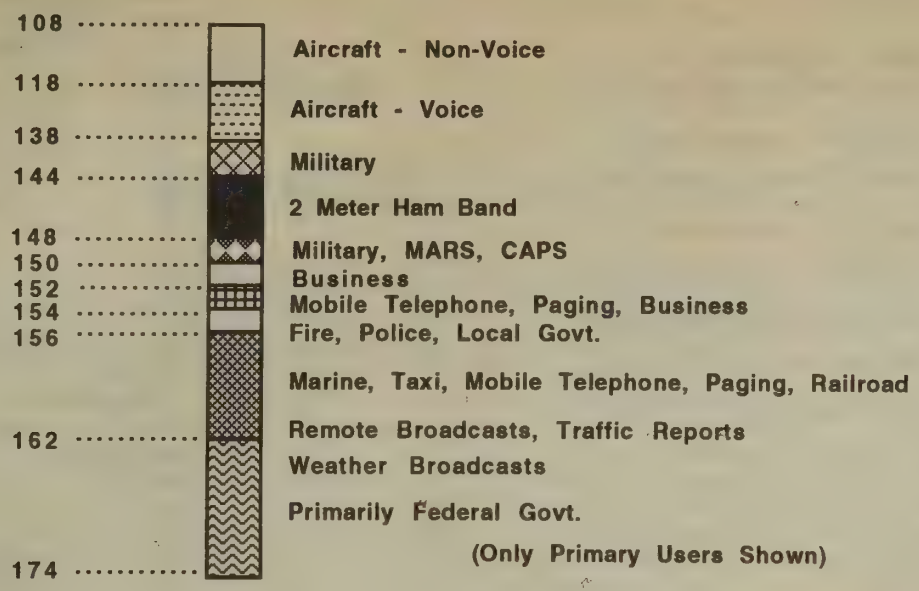


Figure 2. Detailed band chart.

sonnel on the scene of a fire. Some of these are linked back to the town- or city-wide fire communications system. As a result, when there is an active fire you might catch pieces or perhaps just one side of conversations on frequencies you never heard before, since this could be the first time one of these low power repeaters was close enough to your location.

What Else Is There?

Almost every federal service, local government, and private business has a little piece of this spectrum. If you visit a National Park, see if an accommodating ranger will let you examine his handie-talkie. Set yours on the same frequency and you can monitor the rangers while you are in the park.

My vote for the dullest service is the taxi dispatchers. In large cities, day and night, almost continuously these iron-lunged men and women call out locations of waiting riders and ask drivers to take these fares.

Many federal agencies have their frequencies mixed in here. During major events, such as a presidential visit, they will bring their own mobile repeaters.

Look around 161 MHz. Often there are remote broadcast pickups found here. Flying traffic reporters often use these frequencies to transmit their broadcasts to the ground studio. In the same area interstate, commuter, and freight railroads provide day and night traffic. You might be surprised at how often conductors on commuter railroads have to call for help with passenger problems.

Using Your Receiver

The frequencies that you will be listening to are so close to our 2 meter band that for receiving purposes any moderately good 2 meter antenna or duck will work. If you have a particular interest in a frequency in this range, Figure 4 will give you the length of a quarter-wave antenna for the frequency of your choice.

Set your squelch control as low as possible. Some of these stations are weak and if you have the squelch set for the local ham repeater five miles away you could miss some of these little guys.

If your rig has a scan function, start at 148 MHz (for the upper part of the band) or 118 MHz for the aircraft band. Scan up, ready to manually override any data stations which can hang up your scan. A number of these data transmissions are continuous, and some—such as the telemetering from ambulance life support equipment—are on only for a few minutes, but your scan will hold on these transmissions until you manually override them.

You own the rig, and you have the antennas. When the local 2 meter repeater is quiet, listen to these other frequencies—you may find a new hobby. RF

Continued on page 20

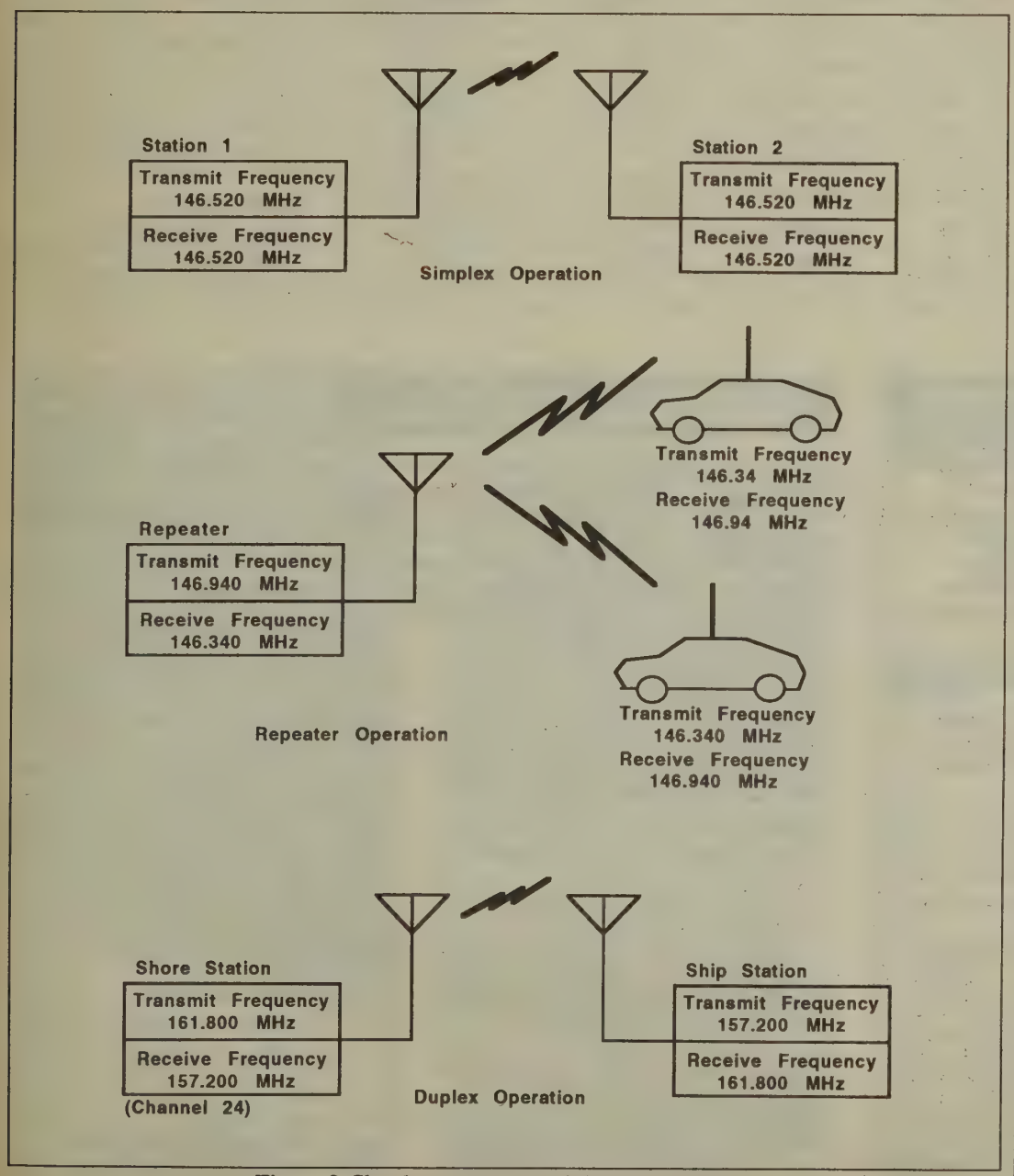


Figure 3. Simplex, repeater and duplex operation.

Removable Call Signs
2 1/4" x 8" PLASTIC
ORDER NOW
AMATEUR RADIO W1AW
- Your Call Letters or Repeater Freq
- Display Sign on Trunk or Rear Window
- Magnetic or Suction-Cup Mounted
- Transferable From Car to Car
- No Call Lettering Remains on Vehicle

Order *-Magnetic or Suction-Mounted Version!* Select *-Black, Blue or Red Background!* PRICE: $9.95 . . .2/$18.
New Ham Discounts SASE Brings Info.
SIGN ON
1923 Edward Lane
Merrick, NY 11566
Serving Ham Radio Over 12 Years
CIRCLE 35 ON READER SERVICE CARD

Satellite City. . .*Now*
Radio City, inc.
Check Us Out
- Warranty Service
- $4 Air charge*
- No Card charge
- Extended Hours

$4 For Air*
* in Continental USA
* under 15 lbs.
Extended Phone Hrs.
8am-8pm C.S.T.
1-800-426-2891

YAESU

Spring Fever Special FT-5100
ICOM

Spring Fever Special IC-737
KENWOOD
TH-78A Spring Fever Special
Complete Library including::
ARRL • RSGB • ARTSCI • W5YI
NOW CANADA
1-800-426-2891
METRO: (612) 786-4475
FAX: (612) 786-6513
2663 County Rd. I
Mounds View, MN 55112
Super Minnesota Watts 1-800-279-1503
CIRCLE 153 ON READER SERVICE CARD

What Else Can You Hear *Continued from page 19*

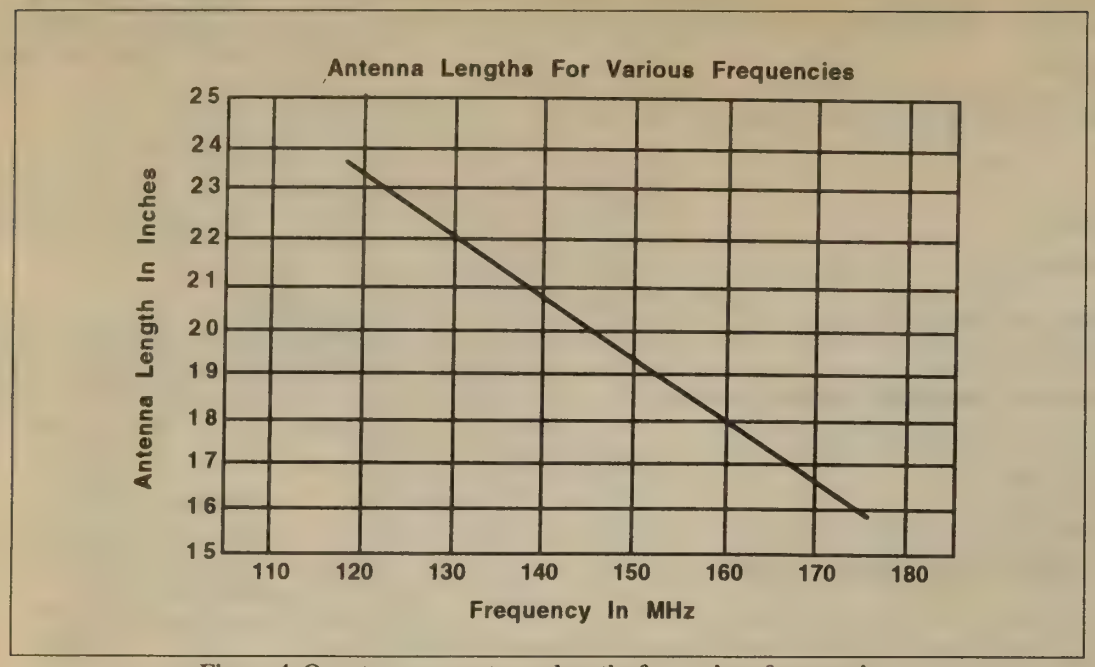


Figure 4. Quarter-wave antenna lengths for various frequencies.

Marine Channels

Channel	Frequency (Ship and Shore)	Note
16	156.800	Distress and Safety Calling Main distress calling frequency. (best bet to monitor)
22	157.100	Liaison—Coast Guard Used as working frequency by Coast Guard. (also a good frequency to monitor)
6	156.300	Intership Safety Intership and Coast Guard ship and aircraft frequency.
15	156.750	Environmental Shore-to-ship only.
17	156.850	Maritime Control
13	156.650	Navigation (bridge-to-bridge)
67	156.375	

Ship-to-Shore Telephone

Channel	Ship Frequency	Shore Frequency
24	157.200	161.800
84	157.225	161.825
25	157.250	161.850
85	157.275	161.875
26	157.300	161.900
86	157.325	161.925
27	157.350	161.950
87	157.375	161.975
28	157.400	162.000
88	157.425	162.025

Port Operations

Channel	Frequency	Note (Ship and Shore)
1	156.050	
63	156.175	
5	156.250	
65	156.275	
66	156.325	
12	156.600	
73	156.675	
14	156.700	
74	156.725	
77	156.875	Intership only
20	157.000 (ship)	161.600 (shore)

Commercial

Channel	Frequency (Ship and Shore)	Note
1	156.050	
63	156.175	
7	156.350	
67	156.375	Intership only
8	156.400	Intership only
9	156.450	
10	156.500	
11	156.550	
18	156.900	
19	156.950	
79	156.975	
80	157.025	
88	157.425	Intership only
72	156.625	Intership only

Non-Commercial

Channel	Frequency (Ship and Shore)	Note
68	156.425	
9	156.450	
69	156.475	
71	156.575	
72	156.625	Intership only
78	156.925	
79	156.975	Great Lakes only
80	157.025	Great Lakes only
67	156.375	Intership only

Transceiver Control Computer Interface

Control **Kenwood, Icom, Yaesu**, and other transceivers. The low power microminiature electronics is built into the DB-25 connector. Power is borrowed from the computer, so there is **no power supply** to pick up RFI. No assembly required. Compatible with **Ham Windows, CT, DXBase, LOGic**, and all other rig control software. **Specify your transceiver make and model number:** we will wire the correct connector for you. Cable and RC-Plus software: **$54.95** ($5 s/h)

Make and Receive Phone Calls on your own Personal Autopatch!

Use any phone line and an HT or base station to make phone calls from your car. **Full duplex** (both parties can talk at the same time) or **simplex** (VOX with turn-around beeps). Programmable local and long distance **access codes**. Regenerated DTMF / Pulse dialing. **Automatic CW identification.** 1.5"Hx4.6"Wx5.1"D RF shielded metal enclosure. **Autopatch $199.95** ($5 s/h) **12V adapter $11.95**

Foreign Orders add $10.
CA orders add Sales Tax.
Money back guarantee.

j-Com · Box 194 T · Ben Lomond CA 95005
(408) 335-9120 FAX 335-9121

CIRCLE 55 ON READER SERVICE CARD

RF ENTERPRISES
TO ORDER 1-800-233-2482
Service & Info: 218-765-3254 Fax:218-765-3308

Complete Inventory

ANTENNAS
TELEX/hy-gain
CUSHCRAFT
DIAMOND

TOWERS
ROHN
HY-GAIN
ACCESSORIES

YAESU ICOM MFJ AEA

BELDEN COAX:
9913 Low loss; 50 ohm.
RG-213/U (8267) 50 ohm. Mil-spec.
RG-8/U (8237) 50 ohm
RG-8/U (8214) 50 ohm. Foam.
RG-8X (9258) 50 ohm. foam
Don't settle for less than the best

ASTRON POWER SUPPLIES
RS-4A RS-7A RS-12A
RS-20A RS-35A RS-50A
RS-20M RS-35M RS-50M
VS-20M VS-35M VS-50M
CALL US FOR YOURS!

COPPERWELD ANTENNA WIRE:
Solid 12 ga; Solid 14 ga . & Stranded 14 ga. Cut to your specs.

ROTOR CABLE:
Standard (6-22, 2-18) Heavy Duty (6-18, 2-16)

We stock Amphenol Connectors
Connectors Installed! Jumpers & custom cable assemblies.
Call or write today! We ship worldwide.

VISA Mastercard
Prices subject to change without notice
Shipping additional except as noted
Returns subject to 20% restocking fee
No antenna or tower returns

RF ENTERPRISES
HC 86 Box 580
Mermfield, MN 56465

CIRCLE 171 ON READER SERVICE CARD

SATELLITE T.V.
Factory Direct to Your Door
Echostar • Startrak • Houston Tracker • Orbitron
24 Hr. Pricing Hotline 516-763-6842
• Call for FREE Huge Color Catalog
• Domestic & International Systems
• Huge Savings!
Info & Orders
ECHOTRAK™ 305-344-6000
4749 NW 98th Lane • Coral Springs, FL 33076

CIRCLE 157 ON READER SERVICE CARD

Sell Your Product In
RADIO FUN
Call
Dan Harper
Today!
800-274-7373

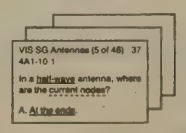
$ BEST PRICES ON PC PARTS $
COMPLETE LINE OF COMPONENTS

MOTHER BOARDS		HARD DRIVES	
386SX-33	$149	IDE107 Mb	$259
386DX-40	$229	IDE 130 Mb	$299
486DLC-33	$419	IDE 213 Mb	$399
1x9x70 SIMM	$40	4x9x70 SIMM	$145
9600 FAX MODEM	$69	350ms CD-ROM, INT	$299
250 Mb tape back up int.			$249

CALL FOR OTHER PRICES
JLP COMPUTERS & ELECTRONICS
2895 Pontiac Lk. Rd.
Waterford, MI 48328
1-800-497-9735

CIRCLE 148 ON READER SERVICE CARD

QUICK, EASY, & COMPACT
Flash cards * NOVICE thru EXTRA * theory Key words underlined. Over 4000 sets in use! For beginner, OMs, XYLs & kids.

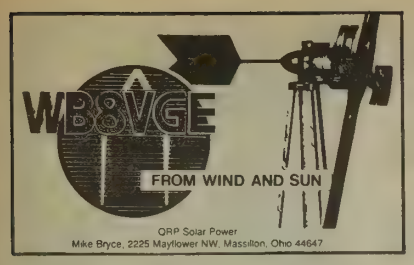


NOVICE	$11.95
TECHNICIAN	$10.95
GENERAL	$ 9.95
ADVANCED	$15.95
EXTRA	$14.45
Shipping 1	—$ 3.00
2 or more	—$ 4.00

CLUB DISCOUNTS

Order Today! from
VIS STUDY CARDS
P.O. BOX 16646
HATTIESBURG, MS 39404

CIRCLE 104 ON READER SERVICE CARD



radio magic

by Michael Bryce WB8VGE

Perhaps the biggest event to hit ham radio since the transistor has been the microprocessor. Up to a few years ago, the microprocessor was just out of the prototype labs and very few radios took advantage of its power. Today, this device seems to be in everything electronic, from the newest hand-held HT to the office coffee maker.

Aside from all the bells and whistles the microprocessor can give us, there is another side to this story. It's the use of a personal computer or PC in ham radio. The microprocessor opened up an entirely new look and feel to ham radio.

I waited and waited before I purchased my first computer for the shack. In fact, for years I thought utilities were gas, electric, and water! I ended up with an Apple IIe that I used until I upgraded to my Apple Macintosh. Now, instead of one computer, I've got seven! Now I know what computer utilities are and I use them regularly.

The computer has another benefit for ham radio: It allows those interested in computers to enter the world of ham radio. By connecting up your computer to a modern-day transceiver you can make all kinds of fun things happen. The computer has made getting one's ticket easier, too. Computer-generated CW for code practice, as well as computer-assisted testing, makes for better ham radio operators.

So, what do you need to make the marriage of computers and ham radio work? Well, first you'll need a computer. Then, depending on what you want to do, you'll need a transceiver that you can talk to with the computer. Let's look at some of the things you'll need to know about purchasing and using a computer.

The C-64

There is no "perfect" computer on the market. If you talk to someone running an old TRS-80 Model 4, then that will be the best computer ever made, until you talk to the guy using a C-64! There is one thing to keep in mind when looking for a computer for your shack: You can't keep up with computer technology! It changes so fast, the computer you get today will be out of date in three months' time.

A couple of years ago, the C-64 was very popular. (It still is, for that matter—it's just not being made anymore.) There's lots of software for this computer. What made the C-64 so popular is the vast library of software written just for ham radio use. There are data bases, CW practice programs, and even control programs to interface with a transceiver. Without software, a computer is nothing but a pile of ICs and wire in a fancy box. The C-64 was reasonably priced, would run a disk operating system, and had color support. It ran the same CPU (microprocessor) as the old Apple II series, the 6502. Some of the software written for the Apple II could be reworked without too much hassle to run on the C-64. Although the BASIC used by Apple (AppleSoft) and the BASIC used by the C-64 are different, they both shared the same CPU.

The C-64 is no longer being made, but you can pick one up in the used computer market. Depending on the number of drives, the monitor and the software, expect to spend from $75 to $400 for a system. I've seen the basic computer selling for $50 at some hamfests.

The C-64 had a very slow DOS (disk operating system) and it could take several minutes to load a long program. The C-64 did not have the conventional RS-232 port required for talking to other devices; they used a TTL port instead. You can purchase a small interface to change the TTL logic over to RS-232 levels. Several companies making radio interfaces (such as AEA) had several units on the market that required no "black boxes" and were plug-in-and-play with the C-64. The Computer Patch 1 is an example of such an interface.

The CoCo

Another computer very popular with hams (but not as popular as the C-64) is the Radio Shack Color Computer. Also known as the CoCo, it supported a faster DOS system and an easy-to-use BASIC by Microsoft. Like the C-64, the CoCo could save and read back programs saved on tape, so you did not need a disk drive unit. These tape programs were very, very slow and you could not use them for a random access data base with any degree of success.

There are several models of the CoCo on the market, from the original CoCo model to the newest model, the CoCo III. Radio Shack dropped the CoCo line last year but you can still get parts and service from the "Shack" if you need to.

The CoCo uses a 6809 CPU. The CoCo also lacked a direct video output port (the CoCo III did have one), so you had to either add on a third-party video driver or use a TV set. Because the CoCo normally used the TV for video, the screen was limited to 32 characters wide. This made the CoCo a second choice among hams. There are many third-party add-ons for the CoCo in the category of video drivers and sound boards.

The CoCo has an RS-232 port, of sorts. Known as a "bit banger," it allowed interfacing with most RS-232 devices. It wasn't real fast—about 1200 baud is the top speed—but it got the job done in most cases. You could plug in an RS-232 program pack and get true RS-232 up to 9600 baud.

The software base is not nearly as large as the C-64's so programs written just for ham radio use were rare. There is some really good software for ham radio use, but not in the quantity seen for the C-64. For these and other reasons, the CoCo for the hams never took off for Radio Shack.

A used CoCo is almost free. Depending on the software coming with the unit, and the model, a CoCo can be picked up for $20; a CoCo III with a drive and RGB monitor for around $200. A CoCo with a basic terminal communication program makes a very good packet terminal, if you don't mind the 32-character screen.

The TRS-80 Model 4

Even older, but very powerful, is the TRS-80 Model 4, the last of the series of TRS-80 microcomputers. (The first TRS-80 was the Model 1 and came with only 4K of RAM and very simple BASIC until you upgraded to the Level II BASIC and 8K of RAM.) This computer WAS the computer for ham radio use. Several magazines were started just for this computer. Wayne Green's *80 Microcomputing* magazine did more to put this computer on the operating desks of ham radio operators than all the ads by Radio Shack.

This computer (as well as the Model III) had the monitor built in with the keyboard. To this day the unit looks great sitting in the shack. The Model 4 provided 80 columns of text. Today, it makes for a great packet terminal. Even though the Model 4 has not been produced in several years, software is still coming on the market for it. In fact, there's a good packet terminal program on Compuserve written just this year for the Model 4. There's quite a bit of software for the Model 4, but it may take some looking to dig it up. The Model 4 also ran the very popular CPM operating system. There is a huge selection of CPM software on BBSs such as Genie and Compuserve.

Some of the older Model 4s did not come with an RS-232 port. You had to add either the Radio Shack board or a third-party board. The newer Model 4s came with the RS-232 board installed, as well as 128K of RAM. The basic Model 4 came with a disk drive (you could get one without a drive and use tape, but not too many people did that since the price of the drives had come down by then) and TRSDOS. You could add a second drive in the computer and TRSDOS would support several more drives.

Be careful when looking for a used Model 4. When they were new, they were very expensive. You could easily drop several grand into a Model 4. Many people try to recover some of their lost dollars by asking too much for one. I sold my Model 4 with 128K RAM and two drives for $50 at a hamfest. Look to spend from that much on up to $250 for one with lots of software and connecting cables.

That's about all the space this month. Next time, we'll look at the most popular computer format used by today's hams, the MS-DOS IBM computer. RF

HUGE NEW CATALOG

Call or write Universal today to receive your free 100 page catalog with prices!

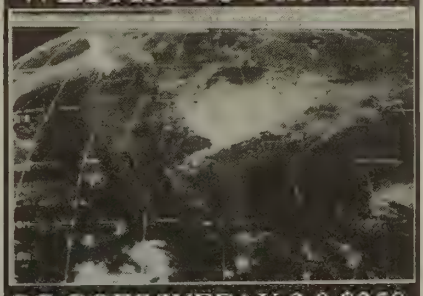
- Communications Receivers
- Portable Receivers
- Amateur Transceivers
- Amateur & SWL Antennas
- Scanners
- RTTY and FAX Equipment
- Books and Manuals
- All major lines: Kenwood, Icom, Yaesu, Alinco, MFJ, Japan Radio, AEA, Sony and Sangean.

This catalog is available FREE by fourth class mail, or for $1 by first class mail.

Universal Radio
6830 Americana Pkwy.
Reynoldsburg, OH 43068
◆ Tel. 614 866-4267
◆ Tel. 800 431-3939
◆ FAX 614 866-2339

Universal-quality equipment since 1942!

WEFAX To The Max



PC GOES/WEFAX 3.0 $250

PC GOES/WEFAX 3.0 is a professional fax reception system for the IBM PC. It includes an AM/FM demodulator, software, cassette tutorial and 325 page manaul. Check this partial list of our advanced features:

Res. up to 1280x800x256 — APT Lat/Lon. Grids
Unattended Operation — Orbital Predcition
Colorization — Frame Looping
Zoom, Pan, Rotation — PCX & GIF Export
Contrast Control — Grayscale Printing
Tuning Oscilloscope — Infrared Analysis
Photometry/Histograms — Variable IOC & LPM

PC HF FACSIMILE 6.0 $99

PC HF Facsimile 6.0 is a complete shortwave FSK fax system for the IBM PC. It includes an FSK Demodulator, software, 250 page manual and tutorial cassette. Call or write for a complete catalog of products.

Software Systems Consulting
615 S. El Camino Real, San Clemente, CA 92672
Tel:(714)498-5784 Fax:(714)498-0568

CIRCLE 250 ON READER SERVICE CARD

Oklahoma Comm Center

ALINCO ICOM YAESU

SPECIAL SPECIAL
CALL

For This Month's Special-Buy
Some Quantities Are Limited

FREE SHIPPING UPS SURFACE
(on purchases of $50.00 or more except antennas)

VISA MasterCard DISCOVER C.O.D.

3900 S. Broadway, Suite 6
Edmond, Oklahoma 73013
Local & Info (405) 359-9554
Fax (405) 359-9556

CALL TOLL FREE
1-800-70K-HAMS
1-800-765-4267

Hours of Operation
M-F 10-6
Sat 10-2
Showroom closed Mondays

SCARED OF THE CODE?

IT'S A SNAP WITH THE ELEGANTLY SIMPLE MORSE TUTOR ADVANCED EDITION FOR BEGINNERS TO EXPERTS—AND BEYOND

Morse Code teaching software from GGTE is the most popular in the world—and for good reason. You'll learn quickest with the most modern teaching methods—including Farnsworth or standard code, on-screen flashcards, random characters, words and billions of conversations guaranteed to contain every required character every time—in 12 easy lessons.

Sneak through bothersome plateaus in one tenth of a word per minute steps. Or, create your own drills and play them, print them and save them to disk. Import, analyze and convert text to code for additional drills.

Get the software the ARRL sells and uses to create their practice and test tapes. Morse Tutor Advanced Edition is approved for VE exams at all levels. Morse Tutor is great—Morse Tutor Advanced Edition is even better—and it's in user selectable color. Order yours today.

For all MS-DOS computers (including laptops).

Available at dealers, thru *QST* or *73* or send $29.95 + $3 S&H (CA residents add 7.75% tax) to:

GGTE, P.O. Box 3405, Dept. MS,
Newport Beach, CA 92659
Specify 5¼ or 3½ inch disk
(price includes 1 year of free upgrades)

CIRCLE 193 ON READER SERVICE CARD

Joe Carr K4IPV

antennas, etc.

by Joseph J. Carr K4IPV

Parts for Antenna Tuning Units

Antenna tuning units (ATUs) are used for several purposes in amateur radio stations. First, they are used to match the feedpoint impedance of the antenna to the transmission line. Second, they can be used to match the input of an antenna transmission line to the output impedance of the transmitter. These don't actually "tune" the antenna, but they reduce the VSWR for the transmitter so the transmitter shutdown circuitry doesn't kick in. For this reason they are called "line flatteners," and are typically characterized by having coaxial cable output and input connections (the former have coax input, but often have other forms of output connector). Third, if the design is correct, the ATU also serves to reduce harmonic emissions of the transmitter. Not all perform this last function; however, some designs, especially in the line flattener category, are actually high-pass filters!

It is easy and not too expensive to purchase antenna tuning units. There are a number of varieties on the market. Photo A shows a typical low-cost amateur radio HF antenna tuner. This particular model is from MFJ Enterprises (Box 494, Mississippi State MS 39762; 1-800-647-1800).

While these devices are relatively easy to obtain on the market, they are also a prime project for a newcomer to the game of building RF projects. Various handbooks, including my own *Practical Antenna Handbook* (TAB Books cat. no. 3270), show the normal circuits for several different designs. As long as the box is well-shielded and the connections are short and direct there is little chance of failure in building such a project. Indeed, it makes a "several evening" or "weekend" project that nearly everyone can produce with only ordinary shop tools.

Photo A. Commercial antenna tuning unit.

Components

One of the things to consider when building an ATU is the nature of the components used. When I draw the circuit for an ATU, it shows variable coils and variable capacitors, but such circuits don't really show the nature of these components. With very few exceptions, the normal "receiver" style components don't work well in antenna tuning units. The transmitter power is too much for them and they will quickly be destroyed.

The variable inductors used in these projects can be either tapped or rotary (Photo B). I prefer the rotary types for two reasons: a) There is no need for an expensive RF power switch; and b) The inductance is continuously variable, so it does not depend on the discrete values of inductance provided by a tapped inductor. If you have a switch, or relay, the tapped inductor will work. I personally prefer the rotary type. The rotary inductor on the top in Photo B was obtained at a hamfest, and is a 28 uH unit. The inductor on the bottom in Photo B is inside a Nevada antenna tuning unit (imported from England). It is shown here because the manufacturers also offer the component separately.

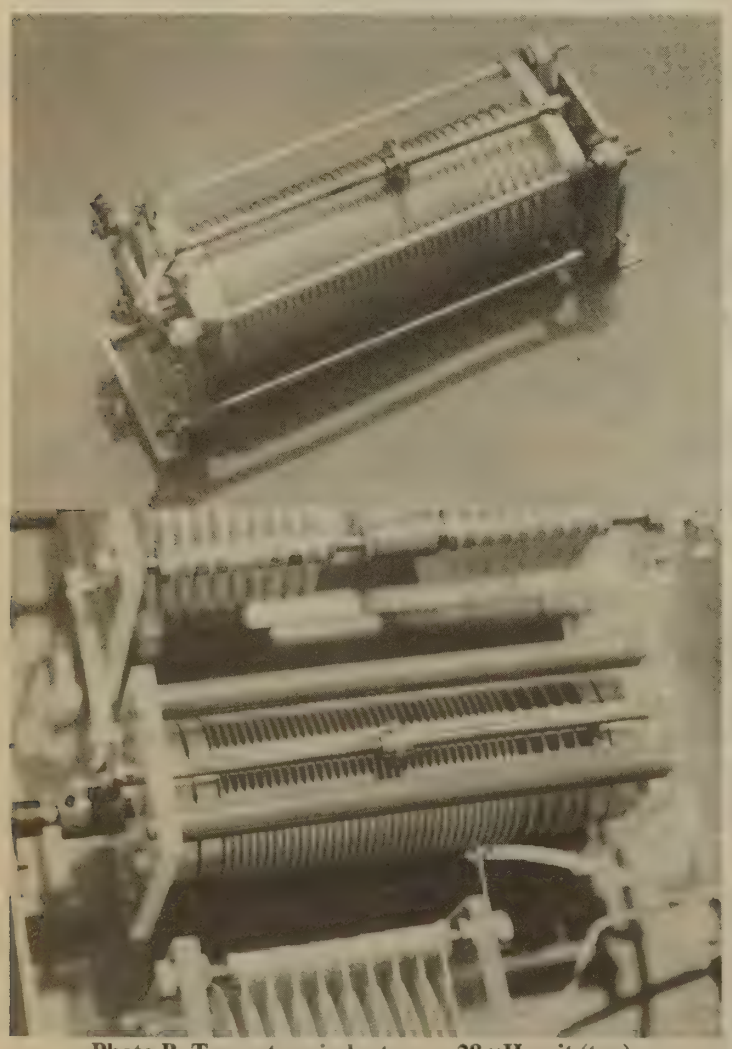


Photo B. Two rotary inductors: a 28 μH unit (top), and a Nevada unit (bottom).

The capacitors used in antenna tuning units can be "receiver" style for medium power level systems when the impedance is 50 ohms. Photo C shows a three-section 365-pF/section broadcast variable used as the "loading" control for a pi-network ATU. The problem is the voltage appearing across the capacitor. These capacitors typically have a 600-volt rating. At 50 ohms, a 2,000-watt transmitter will produce a lower voltage than the rated one, but in high impedance systems, the capacitor will probably arc over rather spectacularly.

For systems over 50 ohms (such as feeding a random length Marconi wire antenna) it is necessary to use a transmitting variable capacitor. These capacitors differ from the receiving type in that the rated working voltage is higher. The rating is a function of the spacing between the plates. A wider spacing provides more air insulation, and therefore a higher working voltage rating. For those who really want to go first-class, try a vacuum variable (if you can afford it).

Finding these parts can be a bit of a chore if you don't know where to look. Hamfests are a good bet. However, be sure to look the parts over very well before purchasing. Unfortunately, ham radio has its crumbums, as does any hobby, who will sell pure crap for new prices. I had nearly bought a seven-position high power RF switch for $45 when I noticed some serious pitting where an arc-over had occurred. The owner had cleaned the switch and offered it "as new." It was flawed. Caveat emptor.

New high power RF parts, suitable for ham bands, can be bought from Barker & Williamson (10 Canal Street, Bristol PA 19007; 1-215-788-5581). Their catalog lists a number of variable inductors, transmitting variables, and both Miniductor and Air Dux prewound air-core inductors. For antenna tuners, the 1.5"-to-3" diameter coils are desirable (the larger the better for higher power applications).

The connections between components in an ATU should be as short and straight as possible. In addition, they should use large diameter wire (#8 AWG) or be very broad and flat. The "strap" method of connection, which uses the very broad and flat material, is preferred because it offers lower stray inductance. One source of materials is your local model and hobby shop. They sell copper and brass stock for model makers in 24" lengths. The available widths are 0.25" to 1.5", in 0.25" increments.

If you hanker for an RF project that has a high probability of success for a newcomer, then give antenna tuners a try. You will find it reasonably easy to achieve good results. RF

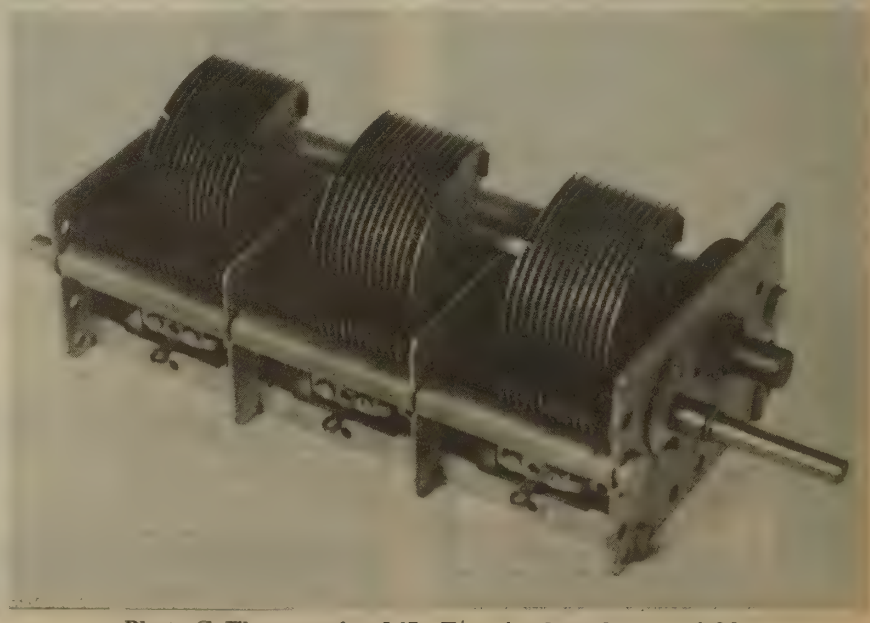


Photo C. Three-section 365-pF/section broadcast variable.

upgrade don't stop now

by Gordon West WB6NOA

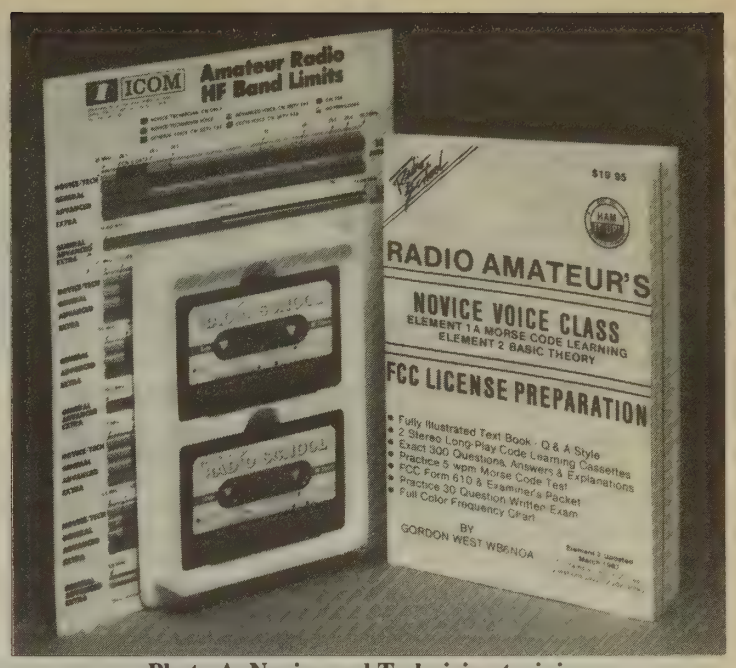


Photo A. Novice and Technician training materials all change this summer.

You Studied the Wrong Stuff

You can imagine the frustration of the would-be ham operator who spent months reading the Novice and Technician test preparation book and then found that every last question was changed on the exam. Yikes—had he been studying the wrong stuff?

Have you recently taken an exam where almost none of the questions were close to what you had been reviewing? If that's the case, something was indeed wrong. There is almost no way that you could study something relatively current and have a test that is not exactly the same as your test prep questions.

All questions are in public domain. Publishers of test preparation books use these questions and their right and wrong answers verbatim. When you take your ham radio test, your examiners will use the exact same question pool, and may not change a single number, a single letter, or a single word on any test question. This means that what you have been studying will be exactly like what will be on the test. If you don't recognize some test questions, chances are you may have skipped over some of these questions in your test prep book!

Photo B. Using test questions on a computer disk is a fun way to check your upgrade progress. The test program may even repeat those questions you missed!

Novice and Tech Questions to Change

On July 1, 1993, all Novice and Technician Element 2 and 3A examination questions will reflect new wording. While the content of the Novice and Technician class question pool will be relatively close to what you may have been studying in the past, the questions will actually be much easier to read and understand.

Novice class questions and answers will be written to the junior high school reading level. Technician class questions and answers will be written to the high school reading level. While the basic content of the questions will be similar to what you may have studied in the past, the actual wording of the questions and the right and wrong answers will be dramatically improved.

If you have been studying existing Novice and Technician class test preparation books, make every attempt to test before June 30th. This way the public domain question pool in your test preparation book will be identical to what will be asked on your upcoming Novice or Tech test.

If you know of someone planning on taking the entry-level Novice, Technician, or combined no-code Novice/Technician *after* July 1st of this year, make absolutely sure they study the new 1993 Element 2 Novice questions and Element 3A Technician class questions. Instantly on July 1 (this coming July!), old questions will be thrown out and the new questions brought online by local volunteer examiners.

It's also anticipated that July 1 may be the final date that any two ham buddies may administer the simple Novice entry-level test. This testing system has worked well, but VEC testing for all other grades of amateur radio licensing has also worked so well that the Novice test will be folded into the VEC program. Chances are, instead of two Generals giving the Novice test, it will now take three Generals, accredited by a local VEC. This should pose no hardship for anyone looking to get into amateur radio via the Novice license and trying to locate some General class hams to give the entry-level test.

For those of you presently licensed, your next step is General class. If you hold a Technician-plus (plus the 5 wpm code) license, General class is within your reach with about 60 days of increasing code speeds from 5 wpm to 13 wpm, and a few weeks of reading over your General class Element 3B study guide. The book reading will be easy—keep in mind that every question must be used, verbatim, on the test. The code takes practice, and in some of my past columns here in *Radio Fun* I have given you at least six different ways to increase code speed.

If you are now a no-code Technician class operator, concentrate on learning the code and taking a VEC 5 wpm code test. The test must be administered by a team of three accredited volunteer examiners. Passing the 5 wpm code test now lets you onto 10 meters, 15 meters, 40 meters and 80 meters CW. On-the-air CW practice will help you get to 13 wpm. When you get close to 13 wpm, begin studying your Element 3B theory book, and then get the General class test *passed!*

The Advanced class questions have been the same for over six years. Any old Advanced class book is more than adequate, and reasonably up-to-date. All it takes is a theory test to get the Advanced out of the way. And then on to Extra class, and this takes at least six months of diligent code practice on the air, and reading over your Extra class test preparation book.

So keep in mind that only the Novice and Technician class test question pools are changing this July 1st. Don't worry if you studied the old material and you are planning on taking the test after July 1st. You didn't waste your time—the old material, plus a quick review of the new reworded Novice and Technician test questions, will be just the ticket for passing the Novice and Technician class tests.

Hope to hear you on the airwaves soon! RF

Davilyn CORP.

VISA

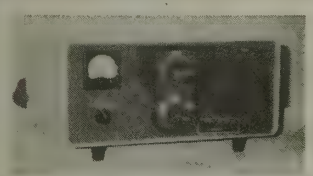
13406 Saticoy Street North Hollywood, CA 91605

CALL FOR FREE CATALOG

818-787-3334 • 800-235-6222 • F-818-787-4732

MasterCard

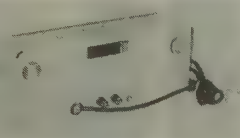
COLLINS 30L-1 LINEAR AMPLI9FIER (S-LINE)



Price: $595.00

Frequency: 80, 40, 20, 15, 10 meters; 3.4 to 5.0 MHz, 6.5 to 9.5 MHz, 9.5 to 16 MHz, 16 to 22 MHz, 22 to 30 MHz. Mode: SSD or CW. Power Out: 1000W PEP, 1000W CW. Drive: 70W-100W full output. Harmonic Distortion: -40 dBc 2nd, -30 dBc 3rd. Output Indendance 5052 VSWR<2:1. Power Requirements: 1200W CW, 300 watts SSB no modulation, 550W SSB speech modulation, voltage 115V or 230V 50-60 HZ. Wt: 38 lbs. Size: 14 3/4W x 7 3/4H x 14D.

PM-2 PORTABLE POWER SUPPLY



Price: $150.00

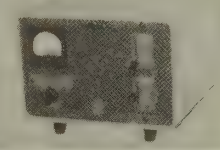
The PM-2 is a lightweight, limited duty cycle power supply providing voltages needed of the KWM-2A. The PM-2 quickly slides into place and connects to the rear of the KWM-2A, ready to operate in minutes from either 115V ac or 220 Vac at 50-400 Hz as a complete portable SSB or CW station. Both transceiver and power supply can be packed in the lightweight CC-2 Carrying Case. A small auxiliary speaker is included in the PM-2 for emergency use. Size:14 3/4W, 7 3/4H, 4D (37.47 cm W, 1969 cm H, 10.16 cm D). Weight: 13.5 lbs. (6.12 kg).

COLLINS KWM - 2A TRANSCEIVER

Price: $795.00

Frequency Range: 3.4 to 30 MHz except 5.0 to 6.5 MHz. Unit cover: 80, 40, 20, 15 and 10 meters. Amateur bands. Modes: SSB, CW or RTTY. Sensitivity: 0.5 uv for 10 db S+N/N. Selectivity: 2.1 KHz, 6 db down; 4.2 MHz, 60 db. Image Rejection: <40 db. Power Output: 3.4 to 15 MHz 100W PEP, 50 ohms; 15 to 25 MHz, 90W PEP, 50 ohms; 25 to 30 MHz 80W PEP, 50 ohms. Plate Input: 175W PEP on SSB; 160W CW. Size: 14 3/4W x 7.3/4H x 14D. Weight: 18 lbs. 3 oz.

312B-4 SPEAKER CONSOLE



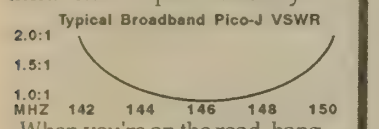
Price: $275.00

The 312-4 integrates the 75S-3C, 32S-3A, 30S-1 and accessories into an operating system. The KWM-2A and 30S-1 can also be combined into an operating system by the 312B-4. A speaker, RF directional wattmeter with 200W and 2000W scales, and phone patch are included in the console. Size: 10W, 7 3/4H, 12 1/4D (25.4 cm W, 19.69 cm H, 31.12 cm D). Weight: 8 1/2 lbs. (3.86 kg).

Pico-J™

Pico-J rolls up and hides in his 4-ounce pocket-sized holder, waiting like the Genie in a bottle till you need full-quieting signal punch.

Call him forth and his glistening black weather-sealed lines reveal a sleek tough end-fed halfwave antenna ready to hang anywhere. Attach **Pico-J** to window glass or curtain rod. Suspend in the apartment closet or patio doorway.



When you're on the road, hang **Pico-J** in the motel window or from a light fixture.

Carry **Pico-J** with you for emergencies. His extra reach can save life.

Pico-J needs no radials for broadband low-angle omni-directional halfwave gain. He improves received signals, stretches simplex range, reaches far away repeaters, saves your battery pack.

Pico-J comes ready for work with 72" isolated coaxial feedline and gold pin BNC.

Hand-Crafted in the U.S.A.

Models
2 meters
220 MHz
440 MHz

AntennasWest
Order Hotline
800-926-7373

19.95 ppd

CIRCLE 90 ON READER SERVICE CARD

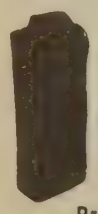
HANDIE-BASE
(PATENT MAILED)

For Your Handheld Radio or Handheld Scanner. Features Include: Solid Walnut Base, Powder Coated Steel Frame, Non-slip Rubber Feet, 5 year Warranty. Models Available for Most Radios or Scanners. Works on Desktops, Tabletops, Work Benches, or any Flat Surface. Add An Extension Speaker/Mic, Power Supply & External Antenna and It Converts Your Handheld Radio Into A Base Station. To order send $14.95 plus $3.50 shipping to

Handie-Base & More Inc.
P.O. Box 2504, Dept. D-2
Broken Arrow, OK 74013-2504
(Please Specify the Size of Your Handheld Radio - Small or Regular)

CIRCLE 182 ON READER SERVICE CARD

Isn't Your Radio Worth The Investment?
Protect It With



THE PACK-IT
FROM TRANSEL TECHNOLOGIES
TRANSEL TECHNOLOGIES

Protect your HT's, Cellular Phones, Pagers, and any other devices you carry that may be subject to damage.

The PACK-IT is made of 1/4" neoprene material which is safety belt sewn to the nylon protective backing. The PACK-IT doesn't frey like many other materials and is safe to wash whenever needed.

The strap and 2" beltloop is made from commercial grade webbing and is secured in the front with a Velcro hook and loop assembly.

The PACK-IT doesn't wear the radio like leather and protects the radio from the small falls which occurs in everyday usage. The neoprene material is a cushion material which not only covers the radio but also protects it. Various sizes available so call for the size to fit your need.

Made In The USA!

$15.95 + $3.00 S&H
1 (800) 829-8321
Dealers Welcome

CIRCLE 11 ON READER SERVICE CARD

what's next?

by Carole Perry WB2MGP

Spaced-Out Projects

There are many wonderful follow-up activities to do with children in a classroom after a radio contact has been made. In dealing with areas of the world that have recently experienced disasters such as earthquakes or hurricanes, it is natural that my sixth-, seventh-, and eighth-graders will want to learn more about these phenomena. This "need to know" experience provides motivation to the youngsters to do research and to create interesting projects encompassing a myriad of social studies, language arts, and geography skills, as well as prompting further study of different areas of science such as geology or meteorology.

With the advent of the SAREX (Shuttle Amateur Radio Experiment) program, many schoolchildren have been given the incredible opportunity of speaking directly with astronauts in space. It's important to note that even if your school isn't one of the fortunate ones picked to participate during an actual space flight, you can still bring lots of fun, excitement, and meaningful learning to the kids by combining ham radio activities with reports, research and projects about astronomy and space.

If we're lucky enough to make a radio contact on the CQ All Schools net (Tuesdays and Thursdays at 17:30 UTC on 28.303 MHz) with an astronaut, that is obviously a fabulous motivation to get the students involved in space-related activities. It's not necessary, however, for the truly creative teacher to have such a dramatic entree into the unit on space communications. The subject of space has fascinated people for thousands of years. Take advantage of this very exciting area of study to lead your students into participation in this stimulating subject.

This term, some of my students decided to do experiments, while others delved into creative activities, letting their imaginations run wild. The following are three very different projects my pupils presented to the class. The beauty of teaching a course in ham radio is that there is enough diversity of material available to the teacher to enable every pupil, regardless of his or her ability, to get involved and master skills appropriate to their individual expertise.

Plants in Space

Genevieve Medida, an eighth-grader, presented a wonderful project which addressed the question, "Will plants grow faster in space or on earth?" With that question as her project problem, she went on to define capillary action as the upward movement of liquids in small areas. The same kind of force of capillary action going against gravity is the force you encounter when you're pushing a book up in the air. It's easier to push it sideways than to push it up because there is no force of gravity acting on it.

The materials she used were water, food coloring, Scotch tape, paper towels, two containers, and a ruler. The procedure was to place two paper towels, one going vertically and one going horizontally, in a container with two cups of water (with food coloring). Genevieve next recorded how much the paper towel absorbed within a three-minute interval.

She observed as she was doing her project that the horizontal paper towel absorbed more water than the vertical one. The conclusion reached was that plants grow faster in a weightless environment because the water can move faster along its stems. This is true because gravity is not present to retard it. Paper towels were used in this experiment because water fills up in tiny spaces between the wood fibers that make up the towel. There are similar tiny channels in the stems of plants, through which water moves. Water is attracted to the walls of these narrow pathways. Because water is cohesive (holds together well), water that is attracted to these walls pulls more water along with it, filling the channels (see Photo A).

Other Classroom Projects

A different kind of project was assembled by Dawn Stevenson KB2PGV and Shiri Factor KB2PET (see Photo B). These two eighth-graders had great fun assembling their own version of a fast-food space station. Samples of packaged astronaut food that is sold in some museums and planetariums were part of the exhibit. Menus were created which listed and described various "astro-dishes." I guess the girls wanted to give their version of what will happen in the future if a space traveler gets a "Big Mac attack."

The next project is one that we're still working on in my seventh-grade classes. I involved colleagues from the math and science departments in my school to work with us on this project. It's always a good idea to include other teachers in big projects—the principal enjoys watching the camaraderie amongst the staff members; all the teachers involved will inevitably pick up some new ideas and approaches, and the children will most certainly benefit from the interaction.

For thousands of years, man has used the rotating earth as a master clock. Our clocks and calendars are based on the movements of the sun and the planets. The period of time it takes for the earth to make one complete revolution on its axis is the basis of our clock system. We used a reference book, *Space and Astronomy,* by Bonnet and Keen, as a guide for our hypothesis that you could make working with time easier by dividing a day into base 10 increments.

The Babylonians were among the first great astronomers. As early as 1800 B.C. they logged star positions on clay tablets. The Babylonians are also responsible for dividing a day into 24 hour periods, an hour into 60 minutes, and a minute into 60 seconds.

Base 10 is much easier to work with in many respects. Our money is founded on the base 10 number system. Government officials in the United States are trying to slowly switch some measurements that are in "hard-to-work-with" forms—like inches, feet, and yards—to metric measurements—centimeters, decimeters, and meters—which use base 10.

The materials needed are an old analog clock (with hands, not a digital clock), white construction paper, a marker, a protractor, and paste. The children paste a piece of white construction paper over the face of an old analog clock. They cut around the hands so that the hands can still be seen. Using a protractor, they mark 10 ev increments on the clock face. The will correspond to "decihours," or any other name your class assigns. There will be 36 degrees between each increment. The marks should be identified with the numbers 1 through 10, where the number 5 is where a 6 is on a traditional clock, and a 10 will be at the top. The children can next create "centihours" by marking 10 increments between each number on the clock face. There will be 100 of these marks on the clock face.

As the kids get faster and more comfortable with this project, they can try to create a clock face to break the increments down to "millihours."

As with everything you do with your classes in ham radio, you must always keep in mind that the object is to have fun while learning. This leads to a positive attitude towards school, and certainly reinforces the idea that ham radio is fun for everyone. Be sure to write to me and let me know how your classes did with these or any other fun science projects which came about in ham radio class.

It's that time again! I'm interested in interviewing enthusiastic, articulate young people who'd like to participate at the Dayton '93 Youth Forum. Please write to me at P.O. Box 131646, Staten Island NY 10313-0006, or call at (718) 983-1416. RF

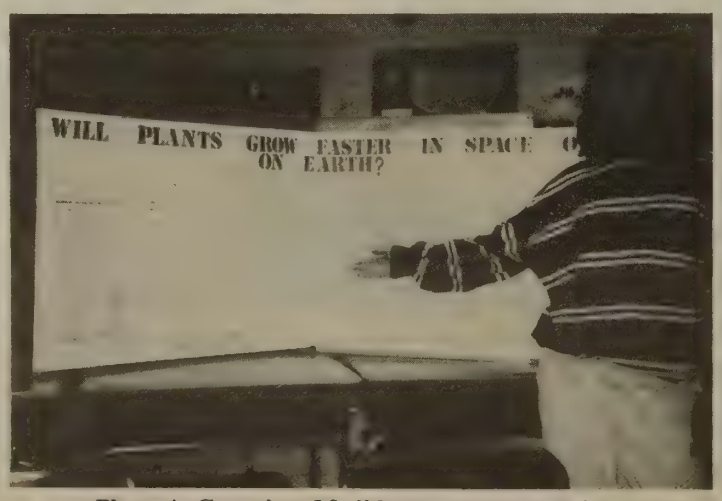


Photo A. Genevieve Medida presents her project, "Will plants grow faster in space or on earth?"

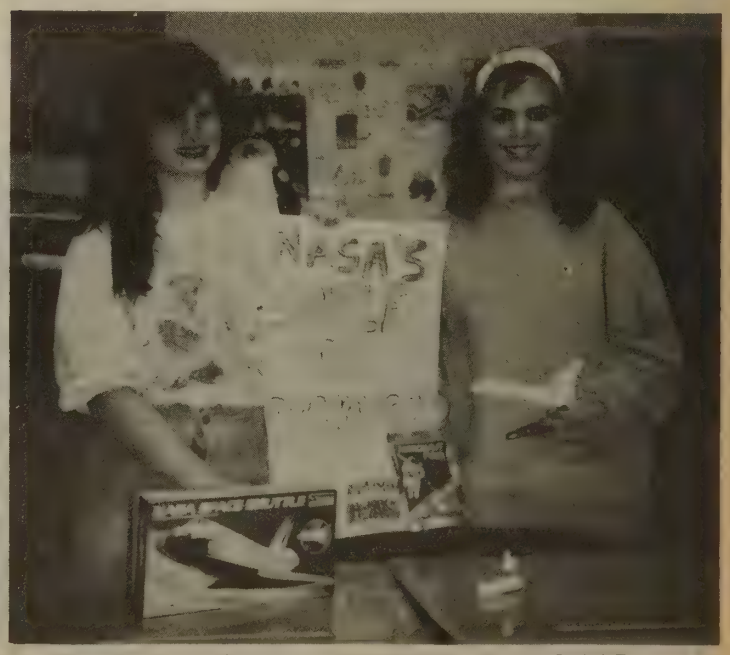


Photo B. Dawn Stevenson KB2PGV (left) and Shiri Factor KB2PET (right) with their fast-food space station.

1 - 800 - 4 - A - HAM - TV
(ORDERS ONLY PLEASE)

***** DUAL RX ! *****

SINGLE BAND TRANSCIEVER $399.95

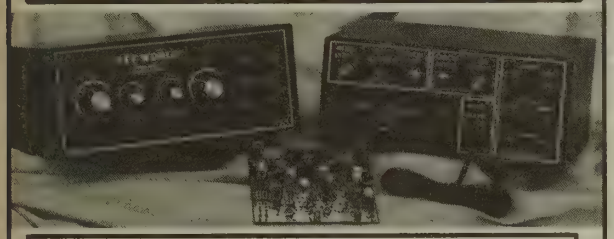
RX 420-450 Mhz TV Ch 3/4 Output
– OR –
RX on 1.2 Ghz TV Ch 7/8 Output
– OR –
RX on 900 MHz TV Ch 2/3 Output
– BOTH –
TX 420-450 Mhz 10 W. 4 Channel
Video Monitor output on TX

Simple Front Panel Layout
Connectors all on Rear Panel
May Upgrade to Dual RX
High Grade Cabinet
Individual RX TV Outputs
Spare Set A/V Jacks on Rear

DUAL BAND RX TRANSCIEVER $489.95

RX 420-450 Mhz TV Ch 3/4 Output
RX on 1.2 GHz or 900 MHz while Tx
TX 420-450 Mhz 10 W. 4 Channel
Video Monitor output on TX

High Quality G-10 Ckt Brds
Solder Mask and Silk Screen
Drive Amps to Full Output
Made in USA by Hams !



BOARD LEVEL PRODUCTS		PRODUCTS in DEVELOPMENT	
Cabinet Bare Silk Screened	$39.95	FM and AM Video/Audio IF System	$99.95
Cabinet with All Hardware	$79.95	900 Mhz Transmitter 4 Ch. 2-3 Watt	$199.95
TX 4 Channel 10 Watt	$189.95	1.2 GHz Transmitter 4 Ch. 2-3 Watt	$199.95
1.2 Ghz, 900 MHz or 430 Mhz RX	$89.95	80 Watt Liner Amplifier 430 MHz	$299.95

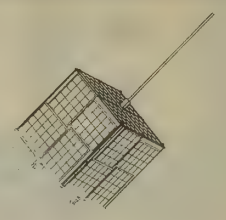
ATV WORLD
PHOENIX ARIZONA — A STEP ABOVE DEAD AIR

TECHNICAL LINE (602) 978-4348
ORDER LINE (800) - 4 - A - HAM - TV (800) 424-2688

3713 W. CHARLESTON AVE GLENDALE, ARIZONA 85308

CIRCLE 17 ON READER SERVICE CARD

AMSAT



Dedicated to Keeping Amateur Radio in Space!

AMSAT — *The Radio Amateur Satellite Corporation* is an organization of Radio Amateurs who design, build and launch satellites for use by Radio Amateurs around the world.

Your new Amateur Radio License will be your ticket to a whole world of exciting opportunities. Why not expand your horizons even further by becoming a member of AMSAT and participating in space aged Amateur Radio?

Join the Excitement! Join the Fun! Join AMSAT!

Yearly Membership dues: $30 U.S., $36 Canada/Mexico, $45 Elsewhere JOIN NOW!

Name _____ Call _____

Address _____

City _____ State _____ Zip _____

$15 of membership dues goes toward a subscription to *The AMSAT Journal*

Post Office Box 27, Washington, DC 20044
Telephone 301-589-6062 Fax 301-608-3410

CIRCLE 110 ON READER SERVICE CARD

Sell your used gear in the
Radio Fun Flea Market
Call Judy Walker today: **1-800-274-7373**

UNADILLA ANTENNA MANUFACTURING CO.

PO Box 4215 BV•Andover•MA•01810

(508) 474-8949 24 Hour FAX

(508) 475-7831 9-5 EST M-F

THE BIG™ SIGNAL
Amateur Antenna Baluns

W2AU (1:1 & 4:1)

For over 20 years, preferred by Amateur, Military and Commercial Operators. Assembled with all stainless steel hardware and a built-in lightning arrester minimizes your TVI, maximizes your power.

W2DU (HF&VHF)

Transformer Baluns
For medium power (1000 watts RF minimum) and broadband operation 3-40 MHz.

W2AU 1:1	W2AU 4:1
50/50 or 75/75Ω	200/50 or 300/75Ω
Dipoles, V's	Hi-Impedance Antennas
Beam Models, Quads	(ie:Folded Dipoles)

Non-Transformer Baluns

W2DU-HF		W2DU-VHF
1.8-30 MHz		30-300 MHz
3000-9000W	w/1:1 SWR	2000-4000W
1500-5000W	w/2:1 SWR	1200-2400W

Contact Your Local Ham Dealer Today!!!

To order direct call (508) 475-7831or write for our informational brochure on our other fine products

Baluns•Antenna Kits•Filters•Center Insulators•ENDsulators™•Coaxial Relays
All products come with a 30 Day Warranty

-NOTICE-

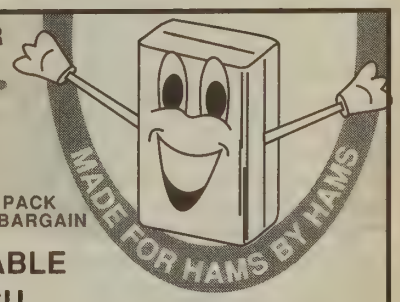
We are the NEW manufacturers of the original JAMES MILLEN™ Products
(508) 975-2711 9am-5pm EST M-F

CIRCLE 136 ON READER SERVICE CARD

Sub-scribe To ***RADIO FUN*** CALL **1-800-257-2346**

PERIPHEX POWER PACKS FOR LONGER
QSO TIME

REMEMBER... A LOW COST POWER PACK WITHOUT PERIPHEX'S QUALITY IS NO BARGAIN



NEW MODELS NOW AVAILABLE

ICOM	YAESU	KENWOOD
BP-83S 7.2V 750mah **$43.50**	FNB-2 10.8V 500mah **$22.50**	PB-13S 7.2V 1200mah **$49.75**
BP-84 7.2V 1000mah **$57.00**	FNB-12 12V 500mah **$45.95**	PB-14S 12V 400mah **$60.00**
BP-84S 7.2V 1400mah **$63.00**	FNB-14S 7.2V 1400mah **$59.75**	
BP-85S 12V 800mah **$76.00**	FNB-26 7.2V 1000mah **$60.00**	
BP-114S 12V 800mah **$79.00**	FNB-27S 12V 800mah **$65.00**	

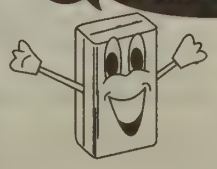
ASK FOR OUR CATALOG

Manufactured in the U.S.A. with matched cells, these Super Packs feature short circuit and overcharge protection, and a 12 month warranty. All inserts and packs in stock or available from authorized dealers. **CALL US TO DISCUSS YOUR BATTERY REQUIREMENTS.**

CALL FOR OUR SPECIAL OFFEERS

Add $4.00 Shipping & Handling for first battery, $1.00 for each add'l battery - U.S. only. Connecticut residents add 6% tax.

VISA DISCOVER MasterCard



PERIPHEX inc.
115-1B Hurley Road, Oxford, CT 06478
800•634•8132
Connecticut 203•264•3985 – FAX 203•262•6943

CIRCLE 68 ON READER SERVICE CARD

RF vintage review

The ICOM IC-751 HF Transceiver

Photo A. The ICOM-751 HF transceiver.

by Gene Smarte WB6TOV

Considering the state of the integrated-circuit art, I suppose it was inevitable that an "amateur" transceiver of this complexity would be made available to hams and shortwave listeners. The ICOM IC-751 HF transceiver is an incredible package of versatility, accomplishing in one unit what a few years ago would have taken an outboard microcomputer in addition to a transceiver.

As Table 1 shows, the IC-751 is really a complete amateur-band-only (including WARC bands) transceiver *and* an all-mode general-coverage receiver. In addition to what you might expect—CW/SSB/AM capabilities—there are also FM and RTTY modes, along with 32 frequency/mode memory and scanning facilities, two VFOs, filters, noise blanker, passband and notch tuning, rock-solid stability, and even an optional synthesized voice to inform you of your frequency. This last feature is particularly intriguing for the visually impaired because frequency determination is probably the hardest parameter to represent non-visually.

For this review, I received the 751 and the optional IC-PS15 outboard power supply. Other options include an internal power supply, external frequency controller, more filters, and other goodies. I carefully unpacked the two boxes and found that ICOM had done an excellent job of protecting its products against shipping damage, and everything, including the documentation, was sealed in plastic. The 32-page instruction manual package also included some functional block diagrams and a complete schematic: a two-sided fold-out that requires a Sherlock Holmes type magnifying glass to read. But it's nice to know you have a chance of tracking something down.

The only connections required are mike, key, antenna, ground, and power cable to the separate supply. The power supply then plugs into 115V AC power, and that's that. Also included is a hefty DC power cable, should you decide to run the 751 directly from 12V DC. But if battery power is contemplated, don't forget that at 200 watts input you'll need 16-18 amps at 12 volts.

As I perused the instruction manual, I soon found that this wasn't the sort of equipment you just intuitively know how to operate; there are over 50 operator controls, some of which function differently, depending on the position or setting sequence of others. But, after a time of reading and experimenting and operating, most things began to make sense. I say "most things" because, in spite of the 751's attempt to be the last word, it has some peculiarities worth mentioning. More on those later.

The 751 accommodates both the ICOM IC-HM12 electret hand mike with fingertip frequency-scanning push-buttons and the IC-SM6 stand microphone. Both are wired for the 8-pin connector on the front panel. Included are a built-in speaker with very good intelligibility and a two-detent headphone jack for speaker, speaker/phones, or phone-only operation. An external speaker jack that disconnects the internal speaker when plugged in is also provided. Audio is clean, crisp, and very strong, and intelligibility seemed best to me with the TONE control at full treble.

When you turn on the 751, there's a pleasant silence and the multi-purpose meter illuminates. The complex digital display is blanked for a second or two, but then, with a definite relay click, the red and blue display comes to life.

The heart of the 751 is digital, including a microprocessor, and the logic is arranged so that on power-up the complex display indicates that the transceiver is in amateur (HAM) or general-coverage (GENE) mode (depending on how you last left it), VFO A is selected, and memory-channel 01 is queued up first. Ham-band coverage is confined to the band segments shown in Table 1, but general-coverage reception is continuous from 100 kHz to 30 MHz.

Operation

Suppose you wanted to check out the gang on 21.380. If you've previously programmed, say, channel 03, then you touch the VFO/M push-button and you're there. Along with the frequency, the digital display shows that you've automatically been put in USB, too. If no one is there and you want to try a favorite haunt on 15m CW, perhaps 04 in memory, a very slight twist of the main-tuning control clicks you instantly into 21.016 in the CW mode. No other controls need be touched. If 15 is dead and

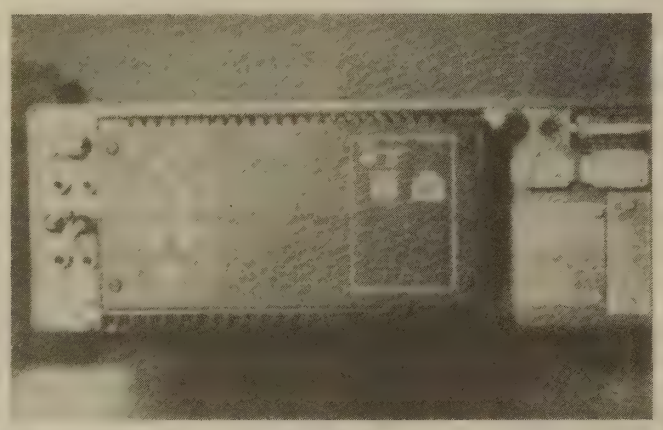


Photo B. The backside of the 751. The legends identifying the connectors are much easier to read than the usual stamped-in letters. The vertical plate in the lower right is rumored to someday soon hold access to the microprocessor's address and data lines.

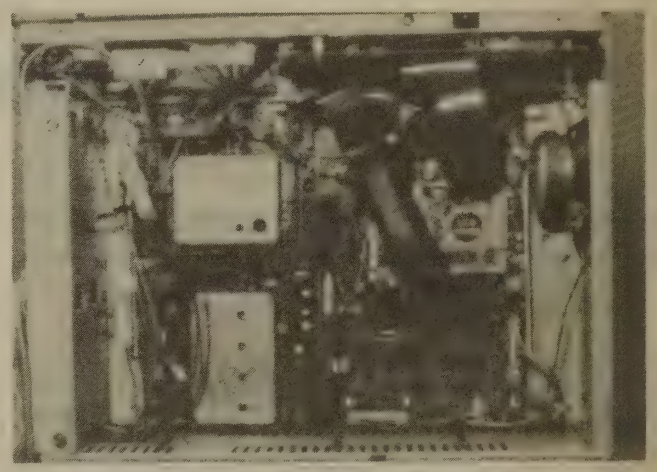


Photo C. The underbelly of the 751. The optional internally-mounted 115V AC power supply mounts on the bottom cover and protrudes into the surprisingly open space.

Model BP-1
Packet Modem
Made in U.S.A.

Tigertronics INCORPORATED

- Packet Radio -
Portable & Affordable!

★ Simple Installation ★ Perfect For Portable
★ No External Power ★ Assembled & Tested
★ Smart Dog™ Timer ★ VHF, UHF, HF (10M)

Whether you're an experienced packeteer or a newcomer wanting to explore packet for the first time, this is the solution you've been waiting for! Thanks to a breakthrough in digital signal processing, we have developed a tiny, but full-featured, packet modem at an unprecedented low price! The BayPac BP-1 will transform your PC-compatible computer into a powerful Packet TNC. Although deceptively simple in appearance, the BP-1 supports sophisticated features like digipeating, file transfers, and remote terminal access, in addition to routine message handling. **Here is YOUR CHANCE to join the PACKET REVOLUTION!**

Tigertronics, Inc. 400 Daily Lane Post Office Box 5210 Grants Pass, OR 97527

Just...
$49.95
+ Shipping

GET YOURS TODAY!

Toll Free Order Line

1-800-8BAYPAC
(1-800-822-9722)

VISA Available Now! MasterCard

(503) 474-6700 *Fax* (503) 474-6703

CIRCLE 269 ON READER SERVICE CARD

Photo D. The seldom-used top-panel controls are recessed, because ICOM knows hams love to stack equipment to the ceiling.

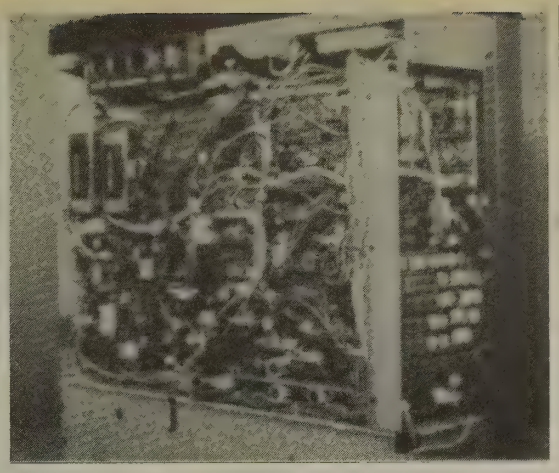


Photo E. With top and bottom covers removed, the 751 struts its stuff.

you want to try 40, a programmed 05 (or any other location up to 32) and another main-tuning-control twitch puts you there, along with auto conversion to LSB. A function switch enables you to change to USB or other modes if desired.

The 751 includes automatic carrier offsets for all modes—as shown in Table 2. So, when you change modes, the built-in calibration to WWV always reflects accurate carrier (or suppressed carrier) frequency. This is one of the little quirks that is kind of hard to get used to. This means that WWV on 10 MHz is displayed as 10.000.0, even when you know you are tuned off carrier frequency for AM reception. As far as mode selection goes, the amateur conventions of LSB on 7 MHz and below and USB from 10 MHz on up are followed.

If for some reason you have used up all 32 memory channels and would like to check propagation on any or all the ham bands, all you need to do is touch the BAND select push-button and turn the main-tuning control. The 751 is programmed to start near the bottom of each band, the exact location of which depends on operating mode—as shown in Table 3. A second touch of the BAND select push-button allows you to tune freely throughout the band.

When you reach, for example, the top of a band, the 751 jumps back to the bottom of the band. Similarly, when you reach the bottom of the band, the next step is back to the top of the band. When you decide to try the next higher or lower band, depress the BAND select switch and rotate the main-tuning control to click into the next band. For general-coverage applications, a similar sequence occurs, but in 1 MHz steps.

After you've made your coarse frequency selection via the BAND select push-button, you have your choice of several tuning-rate options. Slowest is about 2 kHz per rotation of the main-tuning control. If you physically tune faster—that is, spin the dial with a flick of the wrist—the tuning control automatically shifts into a faster rate—about 10 times as fast. Depressing the tuning rate push-button (labled T S) really shifts tuning into warp drive—about 200 kHz per rotation. If all this sounds a little formidable, don't despair. You catch on rather quickly and it gives you enormous band, frequency, and tuning agility.

Because the front panel is already so full of controls and push-buttons, I guess ICOM had to delegate some functions to a different geographical location—in this case, a small auxiliary panel on top of the transceiver, directly above the display. Here you'll find a preamp/attenuator switch that lets you choose among straight-through, 20 dB of attenuation, or 15-20 dB of gain, as near as I could tell. The instruction manual doesn't say what the gain is, but the preamp does work well with little extra noise added in.

Also located on the top are the MARKER switch and CALIBRATOR control. Because the internal logic of the 751 automatically compensates for carrier position and a central synthesizer is common to all bands, you need only dial in WWV on AM, set the display at 10.000.0 MHz, for example, and, with the MARKER switch on, adjust the CALIBRATOR control for zero beat.

Unfortunately, I found this very difficult for several reasons. First, if the WWV signal is weak or exhibiting a moderate amount of QSB or flutter, the calibrate signal strength overpowers it so that it's tough to hear the beat note. Second, owing to the shape of the CALIBRATOR knob, it was difficult for me to make fine adjustments. I did find that by watching the S-meter fluctuations I could zero-beat "visually" better than audibly. The little nub-like switches for the preamp and MARKER switches make it difficult to distinguish their positions, too.

Along with the preamp and calibrate controls are the MONITOR and ANTI-VOX controls, both of which are the same difficult-to-grasp shape. Luckily, these are not used often. And, in all fairness, considering the rock-solid stability of the 751, the calibrate controls won't get used much either. From early morning turn-on until late night power-off, I could detect only a very minute audible (or visual) calibration drift from WWV.

The transmitter, too, is completely solid-state, with a "dial-your-power" control. It is protected from overtemperature by a two-speed, on-demand fan cooling system: Until the temperature of the final's heat-sink structure reaches about 50 degrees C, the fan is off. When 50 degrees C is reached, the fan comes on and stays on in both receive and transmit. Should the temperature climb to 90 degrees C, the fan kicks into high and output power is reduced to 50 watts. According to ICOM, the temperature should never get this high unless there's a problem such as a mismatch or, perhaps, restricted air flow (contests and DXpeditions notwithstanding).

ICOM also warns against operating into a VSWR greater than 2 to 1, apparently because the protection circuitry can't cope. Reduced power and antenna tuners are also suggested for problem matches. Using the 751's built-in SWR meter, I managed to load up easily on 80 through 10.

Although there isn't room in this review to explain adequately all the possible memory/VFO(s)/scan permutations, it quickly became obvious that from a frequency-handling perspective, the 751 should be great for contests and DX. There are two VFOs, a DUPLEX switch to set them up for splits, and both receive and transmit offset provisions. VFOs can be equalized; that is, set to each other instantly by pressing A = B, and memory frequencies and modes can be dumped into the VFOs by touching another switch.

The 751 offers a very flexible scan mode, along with squelch control. Basically, you can set it to scan (top to bottom) (1) the entire general-coverage band, (2) within the limits of the frequencies set in memory positions 01 and 02, (3) all the memory channels, and (4) all the memory channels with a certain mode (such as AM) that you specify. Depending on SQUELCH control setting, the 751 will pause for about 10 seconds on every active frequency before continuing on.

All in all, I would recommend that you get hold of a 751 and do a personal evaluation. You'll need some time, though, to really explore its capabilities. And if all the options promised by ICOM materialize, bring a lunch. Versatility is the watchword, and ICOM has it.

Reprinted from the December 1983 issue of 73 Magazine. RF

Band	Frequency Range (MHz)
160	1.800.0— 1.999.9
80	3.440.0— 4.099.9
40	6.950.0— 7.499.9
30	9.950.0—10.499.9
20	13.950.0—14.499.9
18	17.950.0—18.499.9
15	20.950.0—21.499.9
12	24.450.0—25.099.9
10	27.950.0—29.999.9

Table 1. Amateur-band coverage.

Mode	Display
USB	9.997.0
CW/RTTY	9.999.4
LSB/AM/FM	10.000.0

Table 2. 10-MHz WWC carrier frequency as displayed according to the scheme shown here.

Band	LSB/AM/FM	CW/RTTY	USB
160	1.900.0	1.899.4	1.897.0
80	3.550.0	3.549.4	3.547.0
40	7.050.0	7.049.4	7.047.0
30	10.050.0	10.049.4	10.047.0
20	14.050.0	14.049.4	14.047.0
18	18.050.0	18.049.4	18.047.0
15	21.050.0	21.049.4	21.047.0
12	24.550.0	24.549.4	24.547.0
10	28.050.0	28.049.4	28.047.0

Table 3. Displayed frequency after amateur-band selection.

HELPING HAMS GET ON THE AIR! SINCE 1933

INFORMATIVE STARTER KIT INCLUDES:
- Novice and Tech Written Element Study Guide
- Practice Key and Oscillator
- Code Practice Cassette Tapes
- Theory Tapes
- FCC Rule Book
- Valuable Coupons Good Toward the Purchase of Ham Radio Equipment

PACKAGE PRICE – $59.95

WHETHER YOU'RE AN "O.M." OR JUST A "NOVICE," QUEMENT IS SURE TO MEET ALL YOUR NEEDS!

QUEMENT ELECTRONICS

PHONE (408) 998-5900

1000 S. BASCOM AVENUE • SAN JOSE, CA 95128

FEATURING LINES BY:

ICOM

YAESU U.S.A.

ALINCO

AND THOUSANDS OF ACCESSORIES!

CIRCLE 132 ON READER SERVICE CARD

Radio Fun flea market

Turn your old ham and computer gear into cash now. Sure, you can wait for a hamfest to try and dump it, but you know you'll get a far more realistic price if you have it out where 30,000 active ham potential buyers can see it, rather than the few hundred local hams who come by a flea market table. Check your attic, garage, cellar, and closet shelves and get cash for your ham and computer gear before it's too old to sell. You know you're not going to use it again, so why leave it for your widow to throw out? That stuff isn't getting any younger!

The *Radio Fun Flea Market* costs you peanuts (almost)—comes to 10 cents a word for individual (noncommercial) ads, and 70 cents a word for commercial ads. Don't plan on telling a long story. Use abbreviations, cram it in. But be honest. There are plenty of hams who love to fix things, so if it doesn't work, say so.

Make your list, count the words, including your call, address and phone number. Include a check or your credit card number and expiration. If you're placing a commercial ad, include an additional phone number, separate from your ad. This is a monthly magazine, not a daily newspaper, so figure a couple of months before the action starts; then be prepared. If you get too many calls, you priced it too low. If you don't get many calls, too high.

So get busy. Blow the dust off, check everything out, make sure it still works right, and maybe you can help make a ham newcomer or retired old-timer happy with that rig you're not using.

Send your ads and payment to *Radio Fun Flea Market*, Judy Walker, 70 Route 202 N, Peterborough NH 03458, and *get set for the phone calls.*

The Deadline for the April 1993 Flea Market is February 18, 1993.

WANTED-External Power Supply for Palomar 300A Amplifier with 8 wire with 8 pin plug for back of amp. Good shape only. KB9FFB Harold, PO Box 264, Adams WI 53910. RF200

TOUCH-ACTIVATED CW ELECTRONIC KEYS: Copperback Beetle, Bugaroo, and Copperhead keyer. Our Beetle electronically replaces the cantankerous mechanical "Bug", kit $29.95. The Bugaroo is a compact Beetle for QRP, kit $24.95. The Copperhead keyer replaces the mechanical iambic key, kit $27.95. QRP transmitter kits, Tunable Ultrasonic Receiver, Long Range Listening Tube, Mctrak, McSniff, and many other kits. Send large SASE for catalog. **KRYSTAL KITS**, P.O. Box 445, Bentonville AR 72712. RF215

CUSHCRAFT AV-5 VERTICAL 80 TO 10 METER ANTENNA. Good Condition $65.00. N1MGC John M. C. Wilson, RR #2, Box 368, Peterborough NH 03458. RF230

SENSATIONAL NEW WAY TO LEARN CODE-Do Aerobics, Sing, Jog, or **Drive** while learning code! **Now** the secret is yours! Order **THE RHYTHM OF THE CODE-Morse** code music cassette today! $9.95 ppd **KAWA RECORDS**, P.O. Box 319-R, Weymouth MA 02188. RF247

MINIATURE POLICE RADAR TRANSMITTER one mile range, $41 assembled, $31 kit, (219) 489-1711. P.O. Box 80096, Fort Wayne IN 46898. RF251

HOMEBREW COMPONENTS. Large SASE brings catalog. **KA7QJY COMPONENTS**, Box 3893, Logan UT 84323. RF271

WEATHER INSTRUMENTS. Digital and Traditional. Call for catalog. **THE WEATHER STATION.** (800) 666-7014. RF280

RADIO MODIFICATIONS by FCC licensed electronics technician. $39.95. SASE for radios covered and mods available. Scott Littfin, N0EDV, Route 1, Box 107A, Glidden WI 54527. RF285

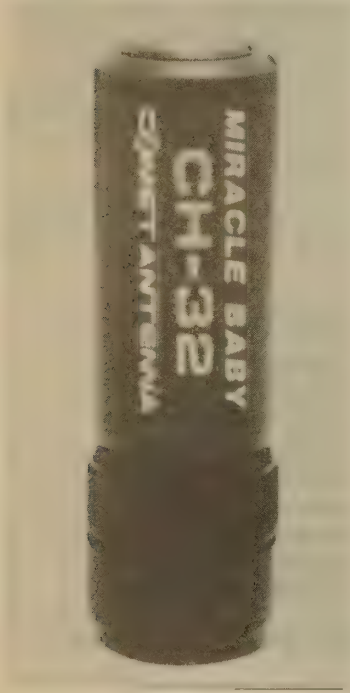
INEXPENSIVE HAM EQUIPMENT. Send stamp for list. WA4DSO, 3037 Audrey Drive, Gastonia NC 28054. RF559

VIDEOCIPHER /SATELLITE/ SCANNER/ CABLE/ AMATEUR/ CELLULAR. Repair Manuals, Modification Books & Software. Catalog-$3.00. **TELECODE**, P.O. Box 6426-RF, Yuma AZ 85366-6426. RF963

SECRET SCANNER Frequencies: Federal, Police, Aero, Military, Cellular, Surveillance, also SWL & CB Books. Big FREE catalog! **CRB RESEARCH**, Box 56-RF, Commack NY 11725. RF996

AMATEUR RADIO REPAIR!! All makes & models, maximum labor per unit, $96.00. **W7HBF, DAN RUPE,** 1302 S. Upland Dr., Camano WA 98292. (206) 387-3558. RF999

new products



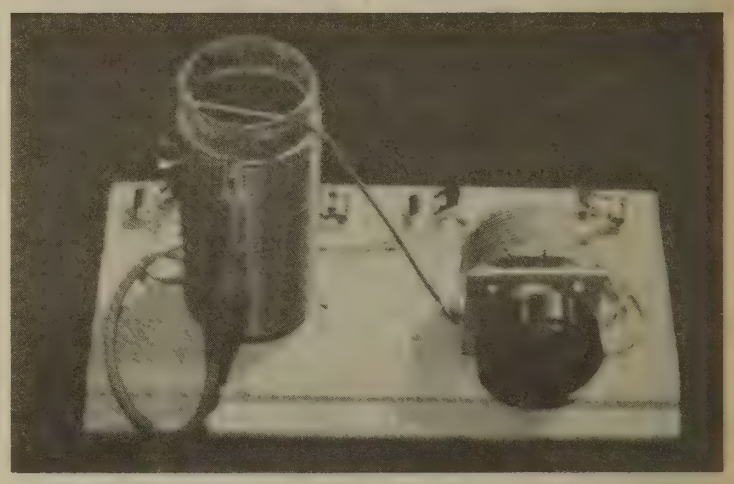
NCG/COMET

COMET Antenna has introduced the newest addition to their extensive line of multiband antennas, the CH-32 "Miracle Baby" Mini HT Antenna for 2m/70cm. The CH-32 has surprising performance, is only 1.75 inches tall, and has a black matte finish and a BNC connector. It is designed with a pivoting head, absorbing shock and protecting the radio's connector from damage. The CH-32 meets the modern operator's need for a small, compact antenna that easily works the nearby repeater systems and is useful for communicating at hamfests, on Field Day, while doing tower work, etc. Its small size makes it inconspicuous and proportionate in size to the newest HT transceivers.

For the price and more information, contact *NCG, 1275 North Grove St., Anaheim CA 92806; (714) 630-4541, (800) 962-2611, Fax: (714) 630-7024.* Or circle Reader Service No. 201.

DWM ENTERPRISES

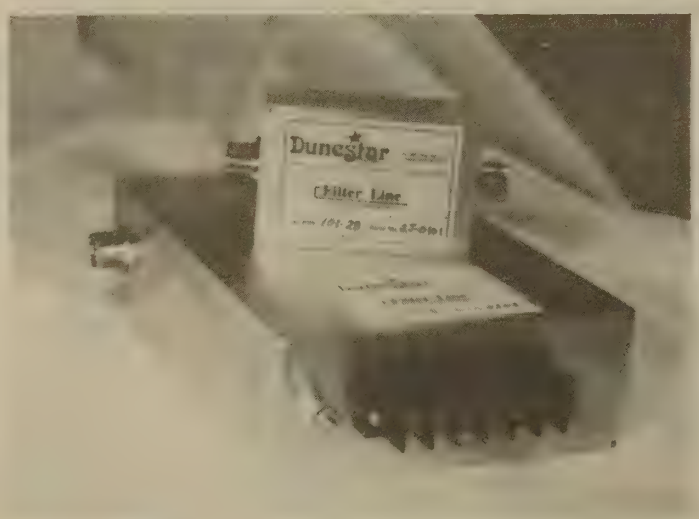
The "Pill Bottle Antenna Tuner" from DWM ENTERPRISES is equipped with just two rugged parts: the tuner's inductor, made from a pill bottle; and durable #22 wire wound and tapped at various intervals along the coil to cover the 80 through 10 meter bands. An alligator clip is used to tap the individual bands. Tuning for SWR is accomplished with a high quality Jackson Brothers 365 pF variable capacitor. The inductor and variable capacitor are mounted on cedar wood stock, giving the tuner a beautiful old fashioned look. Fahnestock clips are used for input and output connections. A variety of antenna designs can be used with this tuner, and experimentation is encouraged. It has been tested to over 150 watts output without arcs or sparks. It is great for both QRP and QRO, for portable or shack operation, for new rigs or old.



The "Pill Bottle Antenna Tuner" is priced at $27, plus $3 S & H, and comes completely assembled and bench tested. For more information, contact *DWM ENTERPRISES, 1709 N. West Avenue, Suite 103, Jackson MI 49202; (517) 563-2784.* Or circle Reader Service No. 203.

DUNESTAR SYSTEMS

Dunestar Systems has released their new line of transceiver bandpass filters. These bandpass filters are designed for use with HF transceivers, providing suppression of IMD, phase noise and harmonics on transmit, as well as protecting the receiver from out-of-band products. Placed in-line between the transceiver and the antenna or amplifier, they provide outstanding band-to-band isolation that is needed for today's crowded RF environment, whether in the close confines of Multi-Multi and Multi-Single Contest Stations, or neighbor-to neighbor in urban and suburban areas. Harmonic suppression afforded by the Dunestar's tailored bandpass filters is very effective in reducing or eliminating TVI problems. Enclosures are all aluminum, 1/8" wall, with excellent mechanical and electrical characteristics.

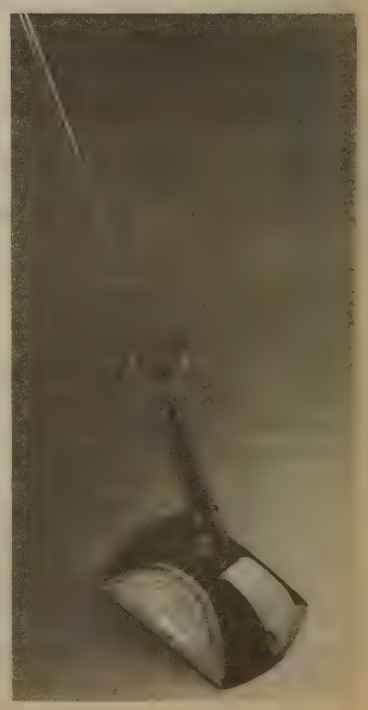


For prices and more information, contact *Dunestar Systems, P.O. Box 37, St. Helens OR 97051; (503) 397-2918.* Or circle Reader Service No. 202.

LARSEN ANTENNAS

Larsen Electronics' new KG 1290 is the first on-glass antenna for amateur application on the 1290 MHz band. Engineered for ham use in North America and Japan, the unit covers the bandwidth from 1235 to 1432 MHz with a VSWR reading below 1.5 to 1. Using a collinear design featuring a 1/2 wave over 1/4 wave, the antenna produces 3 dBd gain. Exceptional performance stems from the patented Kulglass design that places the radiating antenna circuitry in the outside coupler (not inside the vehicle) to maximize efficiency. Model KG 1290 also features a Kulrod copper-plated whip which lets transmit power become signal, not heat resistance.

The suggested retail price is $59.95. For more information, contact *Larsen Antennas, Larsen Electronics, Inc., 3611 N.E. 112th Avenue, P.O. Box 1799, Vancouver WA 98668; (206) 944-7551, Fax: (206) 944-7556.* Or circle Reader Service No. 204.



Uncle Wayne's Bookshelf

BOOKS FOR BEGINNERS

02D42 **Digital Novice** *by Jim Grubbs* Geared to make you a more knowledgable participant. **$8.50**

01A87 **Shortwave Listener's Antenna Handbook** Primer antenna theory. **$13.95**

05C25 **Basic A.C. Circuits** A step-by-step approach for the beginning student. **$24.50**

05E50 **Fun Way Into Electronics** Exciting build and learn projects. **$9.95**

05E51 **One Evenings Electronic Projects** Easy inexpensive one evening projects. **$8.95**

20N018 **Technician Class License Manual: New No-Code** *by Gordon West* This book covers everything you need to become a Technician Class Ham. Every question and answer on the examinations is found in this one book. FCC Form 610 application. **$9.95**

20N092 **The Wonderful World of Ham Radio** *by Richard Skolnik, KB4LCS* Simple, clear, and fun. Introduces young people to amateur radio. **$7.95**

20N100 **Electronics Build and Learn (2nd Ed.)** *by RA Penfold* Combines theory and practice so that you can "learn by doing." **$12.50**

20N099 **Digital Electronics Projects for Beginners** *by Owen Bishop* Contains 12 digital electronics projects suitable for the beginner to build with the minimum of equipment. **$12.50**

AR2073 **Novice Antenna Notebook** A beginners guide to easy and effective antennas and tuners you can build. **$9.50**

AR2871 **W1FB's Help for New Hams** *by Doug DeMaw W1FB* Complete for the newcomer. Put together a station and get on the air. **$10.00**

AR2286 **First Steps in Radio** *by Doug DeMaw W1FB* Series of *QST* articles. **$5.00**

SHORTWAVE

06S57 **1993 Passport to World Band Radio** *by International Broadcasting Services, Ltd* You'll get the latest station and time grids. **$16.50**

03S11 **Shortwave Receivers Past and Present** *edited by Fred J. Osterman* Guide to 200+ shortwave receivers manufactured in the last 20 years. The Blue Book of shortwave radio value. **$8.95**

07R25 **The RTTY Listener** *by Fred Osterman* New and expanded. This specialized book compiles issues 1 through 25 of the *RTTY Listener Newsletter*. Contains up-to-date, hard-to-find information on advanced RTTY and FAX monitoring techniques and frequencies. **$19.95**

03C09 **Shortwave Clandestine Confidential** *by Gerry L. Dexter* Covers all clandestine broadcasting, country-by-country: tells frequencies, other unpublished information: spy, insurgents, freedom fighters, rebel, anarchist radio, secret radio. **$8.50**

03M221 **US Military Communications (Part 1)** US Military communication channels on shortwave. Covers frequencies, background on point-to-point frequencies for the Philippines, Japan and Korea, Indian and Pacific Oceans, and more. **$12.95**

03M222 **US Military Communications (Part2)** Covers US Coastguard, NASA, CAP, FAA, Dept. of Energy, Federal Emergency Management Agency, Disaster Communications, FCC, Dept. of Justice. From 14 KC to 9073 KC. **$12.95**

03M223 **US Military Communications (Part 3)** Completes the vast overall frequency list of US Military services, from 8993 KC to 27,944 KC. **$12.95**

09S42 **The Scanner Listener's Handbook** *by Edward Soomre N2BFF* Get the most out of your scanner radio. **$14.95**

03S208 **Radioteletype Press Broadcasts** *by Michael Schaay* Schedules of Press Services by time, frequency, and country broadcasting in English, French, German, Spanish, and Portuguese. **$12.95**

11T88 **Tune in on Telephone Calls** *by Tom Kneitel K2AES* Formatted as a frequency list with detailed description of each service and its location in RF spectrum. **$12.95**

03K205 **Guide to Radioteletype (RTTY) Stations** *by J. Klingenfuss* Updated book covers all RTTY stations from 3MHz-30MHz. Press, Military, Commercial, Meteo, PTTs, embassies, and more. **$12.95**

11AS10 **Air Scan Guide to Aeronautical Com-munications (5th Ed.)** *by Tom Kneitel K2AES* Most comprehensive guide to monitoring US aeronautical communications. Cover all Canadian land airports and seaplane bases, plus listings for Central America, the Caribbean, North Atlantic, and the Pacific Territories. **$14.95**

15A002 **Scanner and Shortwave Answer Book** *by Bob Grove* Most frequently asked questions by hobbyists. **$13.95**

07A66 **Aeronautical Communications Handbook** *by Robert E. Evans* Exhaustive, scholarly treatment of shortwave aeronautical listening. **$19.95**

07R20 **A Radio Journal 1912-1940** *by Russ Rennaker W9CRC* Easy to read and informative, educational and entertaining. A trip down memory lane to the early days of radio. **$7.95**

11RF13 **The "Top Secret" Registry of US Government Radio Frequencies (7th Ed.)** *by Tom Kneitel K2AES* This scanner directory has become the standard reference source for frequency and other important information relating to the communications of federal agencies. **$19.95**

11F52 **Ferrell's Confidential Frequency List, New Revised Edition** *compiled by A.G. Halligey* All frequencies from 4 MHz-28MHz covering ship, embassy, areo, Volmet, Interpol, numbers, Air Force One/Two, more. **$19.50**

11SR97 **National Directory of Survival Radio Frequencies** *by Tom Kneitel K2AES* Handy and concise reference guide to high interest communications frequencies required by survivalists. **$8.95**

11SM11 **Scanner Modification Handbook, Vol. 1** *by Bill Creek* provides straightforward step-by-step instructions for expanding the operating capabilities of VHF scanners. **$17.95**

11EE06 **Guide to Embassy Espionage Com-munications** *by Tom Kneitel K2AES* Candid and probing examination of worldwide embassy and (alleged) espionage communications systems and networks. **$10.95**

15D93 **1993 Shortwave Directory (8th Ed.)** *by Bob Grove* Extensively revised, the new 1993 Shortwave Directory is the consummate DXer's bible for the first 30 MHz of radio spectrum, including up-to-date and accurate. **$21.95**

20N093 **Vintage Radio 1887–1929** *by Morgan E. McMahon* The authoritative reference book for historians and collectors. **$8.95**

20N094 **A Flick of the Switch, 1930-1950** *by Morgan E. McMahon* Discover the fast-growing hobby of radio collecting. **$8.95**

07R26 **World Wide Aeronautical Communications** *by Robert E. Evans* Aircraft/Air Traffic Control, Aircraft/Company Operations, Aviation Weather Broadcasts, Aeronautical Flight Tests, Worldwide Military Air Forces, Aero Search & Rescue, Aero Law Enforcement, NASA Flight Support, Aero Terms & Abbreviations and Aero Tactical Identifiers. **$6.95**

11T89 **Scanner Modification Handbook Vol. 2** *by Bill Creek* Here it is—a companion to Vol. I. In fact, Vol. 2 has a section that provides improved approaches and updated techniques for the mods in Vol. 1. There's 18 new exciting modifications for popular scanners. **$17.95**

03R01 **World Press Services Frequencies (RTTY) New 5th Ed** A comprehensive manual covering radioteletype news monitoring—contains all information—antenna, receiving, terminal units, plus three extensive frequency lists. **$8.95**

SOFTWARE

04M54 **GGTE Morse Tutor** From beginner to Extra class in easy self-paced lessons. Code speeds from 1 to over 100 words per minute. Standard or Farnsworth mode. Adjustable tone frequency. Create your own drills, practice or actual exams. Exams conform to FCC requirements. 5 1/4" floppy for IBM PC, XT, AT, PS/2 or compatibles. **$19.50**

04M55 **Advanced Edition $29.**9520N021 **No Code Ham Radio Education Package** Computer software package. Includes computer aided instruction software (IBM compatible), 200 page Ham Radio Handbook. **$28.95**

20N022 **Ham Operator Education Package** Computer software contains five IBM compatible discs with all questions for all license classes, plus "Morse Academy" code teaching software that takes you from 0-20 wpm. **$28.95**

Lanze Code Programs—(Available on 5 1/4" disk.) Inexpensive complete study guide code programs for both the C64/128 Commodores and the IBM compatibles. Programs include updated FCC questions, multiple choice answers, formulas, schematic symbols, diagrams, and simulated (VE) sample test.

IBM Part#	Commodore Part#		Price
Novice	IBM01	COM01	$14.95
Tech	IBM02	COM02	$14.95
General	IBM03	COM03	$14.95
Advance	IBM04	COM04	$19.95
Extra (New Pool)	IBM05	COM05	$19.95

IBM06, COM06 IBM/Commodore Tech No Code—Lanze Code Program Contains all the authorized FCC questions and answers used in testing formulas, schematic symbols, diagrams, and sample test for passing the new Technician No Code license. **$24.95**

IBM97 **Amateur Radio Part 97 Rules** Includes updated, revised Commission's Rules, September 30, 1989 5 1/4" disk IBM compatible only. **$9.95**

STUDY AIDS

VIS Study Cards Compact, up-to-date Flash Cards with Key Words, Underlined, Quiz on back. Formulas worked out. Schematics at your fingertips. Used SUCCESSFULLY by ages 6 to 81!

NOVICE	VIS01	$11.95
TECH	VIS02	10.95
GENERAL	VIS03	9.95
ADVANCED	VIS04	15.95
EXTRA	VIS05	14.45

UHF/VHF PACKET

01P22-2 **The Packet Radio Handbook (2nd Ed.)** *by Jonathan L. Mayo KR3T* "...the definitive guide to amateur packet operation."—Gwyn Reedy W1BEL **Only $15.00**

09V11 **The Basic Guide to VHF/UHF Ham Radio** *by Edward M. Noll* Provides a first rate introduction to the 2.6 and 1.25 meter bands as well as 23, 33, and 70cm. **$6.50**

20N019 **U.S. Repeater Mapbook** *by William Smith N6MQS* The Guide for traveling radio amateurs. **$9.95**

03R02 **RTTY Today** *by Dave Ingram K4TWJ* Most comprehensive RTTY guide ever published. **$8.50**

ANTENNAS

20N108 **The Easy Wire Antenna Handbook** *by Dave Ingram K4TWJ.* Gives you all of the needed dimensions for a full range of easy to build and erect "sky wires." **$9.50**

01A70 **Practical Antenna Handbook** *by Joseph J. Carr* Design, build, modify, and install your own antennas. **$21.50**

10A342 **All About Verticle Antennas** *by William Orr* Comprehensive coverage of amateur communications. **$10.50**

10A345 **Beam Antenna Handbook** *by William Orr and Stuart Cowan* Everything you need to know about beam design, construction, and operation. **$11.95**

05A95 **Easy-up Antennas for Radio Listeners and Hams** *by Edward M. Noll* Like to learn how to construct low-cost, easy-to-erect antennas? **$16.50**

ARRL BOOKS

AR1993 **ARRL 1993 Handbook (69th Ed.)** 39 chapters, featuring 2,100 tables, figures and charts. Comprehensive, well organized and affordable. **$25.00**

AR1086-4 **ARRL Operating Manual (4th Ed.)** Information on how to make the best use of your station, including: interfacing home computers. OSCAR, VHF-UHF. **$17.00**

AR0194 **Antenna Compendium Vol. 1** Materials on verticals, quads, loops, yagis, reduced size antennas, baluns, Smith Charts, antenna polarization. **$10.00**

AR2545 **Antenna Compendium Vol. 2** Covers verticals, yagis, quads, multiband and broadband systems, antenna selection. **$12.00**

AR2626 **Companion Software for Antenna Compendium Vol. 2** 5 1/4" MS-DOS floppy. **$10.00**

AR0488 **W1FB's Antenna Notebook** *by Doug DeMaw W1FB* Get the best performance out of unobtrusive wire antennas and verticals. Build tuners and SWR bridges. **$9.50**

AR0348 **QRP Notebook** *by Doug DeMaw W1FB* Presents construction projects for the QRP operator. **$9.50**

AR4141 **W1FB's Design Notebook** *by Doug DeMaw W1FB* Filled with simple practical projects that can be built using readily available components and common hand tools. **$10.00**

AR2200 **Antenna Impedance Matching** *by Wilfred N. Caron* Most comprehensive book written on using Smith Charts in solving impedance matching problems. **$15.00**

AR0402 **Solid State Design** Good basic information, circuit designs and applications: descriptions of receivers, transmitters, power supplies, and test equipment. **$12.00**

AR3193 **Weather Satellite Handbook (4th Ed.)** *by Dr. Ralph Taggart WB8DQT* Expanded and revised to reflect today's weather-fax satellite technology. **$20.00**

AR3290 **Companion Software for Weather Satellite Handbook** 5 1/4" MS-DOS Floppy. **$10.00**

AR3291 **Now You're Talking!: Discover the World of Ham Radio.** Covers everything you need to know to earn your first Amateur Radio license. More than a study guide, this book will help you select equipment for your ham radio station and explain how to set it up—everything you'll need to know to get on the air! **$19.00**

AR3292 **Your Introduction to Morse Code: Practice Cassettes** Kit includes two 90 minute cassette tapes. Prepares you for the 5 WPM Morse code exam to earn your Novice license or add high-frequency worldwide communications privileges to your code-free Technician license. **$10.00**

AR0437 **ARRL Repeater Directory 1992-1993** 19,000+ listings with digipeaters, bandplans, CTCSS (PL(TM)) tone chart, frequency coordinators, ARRL special service clubs, and beacon listings from 14 MHz to 24GHz. **$6.00**

AR1033 **The DXCC Companion** *by Jim Kearman KR1S* Spells out in simple, straightforward terms what you need to be a successful DXer. **$6.00**

AR1250 **Log Book**—Spiral **$3.50**

ARA341 **Interference Handbook** RFI sleuth's experience in solving interference problems. **$12.00**

AR2197 **ARRL Data Book** Valuable aid to the RF design engineer, technician, radio amateur, and experimenter. **$12.00**

AR2960 **Transmission Line Transformers (2nd Ed.)** *by Dr. Jerry Sevick W2FMI* Practical designs and specific information on construction techniques and sources of material. **$20.00**

AR0410 **Yagi Antenna Design** *A Ham Radio* series polished and expanded by Dr. Lawson. **$15.00**

AR2171 **Hints and Kinks** Ideas for setting up your gear for comfortable, efficient operation. **$8.00**

AR3169 **QRP Classics** Compilation of ARRL publications on building receivers, transmitters, transceivers, accessories. **$12.00**

ARRL **License Manuals** Complete FCC question pools with answers.

AR2375 **Technician Class**	$6.00
AR2383 **General Class**	$6.00
AR0166 **Advanced Class**	$6.00
AR2391 **Extra Class**	$8.00

AR3185 **The Satellite Experimenter's Handbook, (2nd Ed.)** *by Martin Davidoff K2UBC* Expanded and revised. Focusing on satellites built by and for the international radio amateur community. **$20.00**

AR0477 **Low Band Dxing** How to meet the challenges of the different forms of 160, 80, and 40 meter propagation with effective antennas, equipment, and operating strategies. **$10.00**

AR2456 **FCC Rule Book (8th Ed.)** A must for every active radio amateur. **$9.00**

AR2030 **Your Gateway to Packet Radio (2nd Ed.)** Tells everything you need to know about this popular new mode. **$12.00**

AR2103 **Satellite Anthology** The latest information on OSCARs 9 through 13 as well as the RS satellites, the use of digital modes, tracking antennas, RUDAK, microcomputer, and more! **$5.00**

AR2898 **Space Almanac** *by Anthony R. Curtis K3KXK* Recent news from space. **$20.00**

AR2083 **Complete DX'er (2nd Ed.)** *by Bob Locker W9KNI* Learn how to hunt DX and obtain hard-to-get QSL cards. **$12.00**

AR2065 **ARRL Antenna Book** The new 16th Edition represents the best and most highly regarded information on antenna fundamentals, transmission lines, design, and construction of wire antennas. **$20.00**

AR3293 **Morse Code: The Essential Language** *by L. Peter Carron Jr. W3DKV* Expanded and revised in its 2nd edition. How to handle distress calls heard not only on the hambands but on maritime and aircraft frequencies. **$6.00**

REFERENCE

202101 **Everyday Electronics Data Book** *by Mike Tooley BA* A basic electronic "recipe" book using commonly available components. **$18.00**

20N102 **Practical Digital Electronics Handbook** *by Mike Tooley BA* Contains nine digital test gear projects. Digital circuits, logic gates, bistables and timers, microprocessors, memory and input/output devices. **$14.50**

20N103 **Electronic Power Supply Handbook** *by Ian R. Sinclair* Covers many types of supplies—batteries, simple AC supplies, switch mode supplies and inverters. **$16.25**

20N104 **Electronic Test Equipment Handbook** *by Steve Money* A guide to electronic test equipment for the engineer, technician, student and home enthusiast. **$18.00**

20N105 **Digital Logic Gates and Flip-Flops** *by Ian R. Sinclair* A firm foundation in digital electronics. Treats the topics of gates and flip-flops thoroughly and from the beginning. **$18.00**

01C80 **Master Handbook of 1001 Practical Electronic Circuits** Tried and proven solid state circuits. **$19.95**

01P68 **Pirate Radio Stations** *by Andrew Yody* Tuning in to underground broadcasts. **$12.95**

01T01 **Transmitter Hunting** *by Joseph Moell and Thomas Curlee* Radio direction finding simplified. **$19.95**

02C30 **Commodore Ham's Companion** *by Jim Grubbs* Commodore computer and the Ham. **$9.50**

03R02 **Rtty Today** *by Dave Ingram* Modern guide to amateur radioteletype. **$8.50**

03S04 **Hidden Signals on Satellite TV** *by Thomas Harrington* The secret signals on the satellites. **$19.50**

05E01 **Basic Electricity and Electronics** The fundamentals of electronics, book 1.**$11.95**

05E02 **Basic Electricity and Electronics** The fundamentals of electronics, book 2. **$9.95**

05E03 **First Book of Modern Electronics** Unique projects that are money saving. **$12.95**

09D22 **The World Ham Net Directory** *by Mike Witkowski* New—2nd edition. Introduces the special interest ham radio networks and shows you when and where you can tune them in. **$9.50**

09P33 **Pirate Radio Directory** *by George Zeller* Where to tune in on secret entertainment stations. **$7.95**

10F093 **1993 International Callbook** The new 1993 International Callbook lists 500,000+ licensed radio amateurs in the countries outside North America. It covers South America, Europe, Africa, Asia, and the Pacific area (exclusive of Hawaii and the U.S. possessions). **$29.95**

10D093 **1993 North American Callbook** The 1993 North American Callbook lists the calls, names, and address information for 500,000+ licensed radio amateurs in all countries of North America. **$29.95**

05H24 **Radio Handbook, 23rd Ed.** *by William I. Orr W6SAI* 840 pages of everything you wanted to know about radio communication. **$29.50**

02B10 **Heath Nostalgia** *by Terry Perdue K8TP* 124 page illustrated history of the Heath Company. Includes many fond memories contributed by long-time Heathkit employees. **$9.50**

10DF92 **1992 Callbook Supplement** An update to the 1992 International and American callbooks. **$10.00**

12E76 **Basic Electronics** *Prepared by the Bureau of Naval Personnel* Covers the important aspects of applied electronics and electronics communications. **$10.95**

12E41 **Second Level Basic Electronics** *Prepared by the Bureau of Naval Personnel* Sequel to Basic Electronics, thorough treatment of the more advanced levels of applied electronics. **$7.50**

01D45 **The Illustrated Dictionary of Electronics, 5th Ed** *by Rufus P. Turner and Stan Gibilisco* An exhaustive list of abbreviations, and appendices packed with schematic symbols and conversion tables. **$26.95**

20N091 **Most-Often-Needed Radio Diagrams and Servicing Information, 1926-1938, Volume One** *compiled by M.N. Beitman* An invaluable reference for anyone involved in Vintage Radio restoration. **$11.95**

20N096 **How To Read Schematics (4th Ed.)** *by Donald E. Herrington* Written for the beginner in electronics, but it also contains information valuable to the hobbyist and engineering technician. **$14.95**

20N097 **Radio Operator's World Atlas** *by Walt Stinson, W0CP* This is a compact (5x7), detailed, and comprehensive world atlas designed to be a constant desk top companion for radio operators. **$17.95**

20N098 **Electromagnetic Man** *by Cyril Smith and Simon Best* Health and hazard in the electrical environment. **$29.95**

20N020 **Secrets of RF Circuit Design** *by Joseph J. Carr* Written in clear non-technical language, covers everything from antennas to transistors. **$19.50**

20N107 **Ham Stuff** A comprehensive buyer's guide and directory. **$19.95**

20N109 **73 Magazine Index 1960-1990** A complete index to every article published in *73 Magazine* through 1990. Book **$15.00** IBM software (specify type) **$20.00**

20N110 **Product Reviews Since 1945** Contains an index to 3,400 product reviews that have appeared in *QST, CQ, HR, 73* and *Radcom*. Book **$12.95** IBM Software 5.25 **$10.00**

CODE TAPES

73T05 **"Genesis" $5.95**
5 wpm—This beginning tape, takes you through the 26 letters, 10 numbers, and necessary punctuation, complete with practice every step of the way.

73T06 **"The Stickler" $5.95**
6+ wpm—This is the practice tape for those who survived the 5 wpm tape, and it's also the tape for the Novice and Technician licenses. It is comprised of one solid hour of code. Characters are set at 13 wpm and spaced at 5 wpm.

73T13 **"Back Breaker" $5.95**
13+ wpm—Code groups again, at a brisk 13+ wpm so you'll be really at ease when you sit down in front of a steely-eyed volunteer examiner who starts sending you plain language code at only 13 per.

73T20 **"Courageous" $5.95**
20+ wpm Congratulations! Okay, the challenge of code is what's gotten you this far, so don't quit now. Go for the extra class license. We send the code faster than 20 per.

NEW STUFF

SS8756 **Warning! The Electribity Around You May Be Hazardous To Your Health** *by Ellen Sugarman* An invaluable guide to the risks of electromagnetic fields, and steps you can take to protect yourself and your family. **$11.00**

Wayne's Book **"We the people" Declare War! On our lousy government.** *by Wayne Green* A "must read" for every american taxpayer. Solutions to every problem facing our governemnent today. **$12.95**

Uncle Wayne's Bookshelf Order Form

You may order by mail telephone, or fax. All payments are to be in US funds. Allow 3 weeks for delivery.

Item #	Title	Qty.	Price	Total

Shipping
All orders add $5.00 shipping.
U.S. orders shipped UPS. (Alaska & Hawaii shipped via mail.)
Airmail to Canada and all overseas orders FOB Peterborough, NH.
Make checks payable to "Uncle Wayne's Bookshelf."

SHIPPING
TOTAL

Name _____

Street _____

City _____ State _____ Zip _____

TOTAL $ _____ ❑AE ❑MC ❑VISA ❑Check/Money Order

Card # _____ Expiration Date _____

RF0393

Telephone: (603) 924-4196 (800) 234-8458 FAX: (603) 924-8613
Mail: *73 Magazine*, Attn. Uncle Wayne, PO Box 3080, Peterborough, NH 03458

activities calendar

Send your announcements to: Radio Fun Activities Calendar, 70 Route 202-N, Peterborough NH 03458.
We'll print as many as space allows, on a "first come-first listed" basis.

FEB 28

MATTAPOISET, MA An Amateur Radio Flea Market will be held at Knights of Columbus Hall starting at 9 AM. Talk-in on 146.52 MHz. Contact *Kenneth Rapoza K1NSX, 19 Golf St., Fairhaven MA 02719. Tel. (508) 993-3993.*

MAR 6

TEXARKANA, TX The Four States ARC will sponsor its 4th annual Hamfest at the YWCA Bldg. Doors open at 8 AM. VE Testing at 1 PM. Talk-in on 146.62. Contact *Travis K5AVH, FSARC Hamfest, 1260 Canadian Texarkana TX 75503. Tel. (903) 792-2080.*

MAR 12

ST. LOUIS CITY, MO The Jefferson Barracks ARC will hold their 33rd annual Radio Auction at the Concordia Turner's Hall, 6432 Gravois. Doors open at 5 PM, the auction starts at 7:30 PM. Contact *Vivian K. Scott WD0EMS, 4121 Fabian Dr., St. Louis MO 63125. Tel. (314) 631-4068.* Talk-in on 146.94 and 145.21.

MAR 13

FLEMINGTON, NJ The Cherryville Repeater Assn. II will host its annual Flemington Hamfest from 8 AM-2 PM at the Hunterdon Central High School Field House. Talk-in on 147.375+. Contact *Keith Burt KF5FK, P.O. Box 308, Quakertown NJ 08868-0308. Tel. (908) 788-4080.*

SCOTTSDALE, AZ The A.R.C.A. Spring Hamfest will be hosted by the Scottsdale ARC from 7 AM-4 PM at Scottsdale Comm. College (East parking lots) 9000 E. Chaparral. Talk-in on 147.18 and ZIA Link. Contact *Ron Avery WB6PEB, Hamfest Chairman, 9039 N. 127 St., Scottsdale AZ 85295. Tel (602) 391-2388; FAX (602) 451-3876,* or write to *S.A.R.C. Hamfest, P.O. Box 10878, Scottsdale AZ 85271-0878.*

MAR 13-14

CHARLOTTE, NC The Mecklenburg ARS will host their 1993 Charlotte Hamfest/Computerfair, and also, the 1993 ARRL Roanoke Div. Convention, at the Charlotte Merchandise Mart, 2500 E. Independence Blvd. (US 74). There will be FCC exams by the Charlotte VEC on Sun. Contact *Charlotte Hamfest, P.O. Box 221136, Charlotte NC 28222-1136. Tel. (704) 841-HAMS.*

MIDLAND, TX Midland ARC will hold their annual St. Patrick's Day Swapfest from 9 AM-5 PM on Sat., and from 8 AM-2:30 PM on Sun., at the Midland County Exhibit Bldg. VE Exams at 12 PM Sat. Contact *N5TQU or N5UNH* at *MARC, P.O. Box 4401, Midland TX 79704.*

MAR 14

BRISTOL, CT The Insurance City Repeater Club will hold its annual Hamfest/Computer Flea Market from 9 AM-2 PM at Bristol Eastern High School, King St. (Rte 229). Talk-in on 146.88, 224.80. VE Exams by pre-registration only. Write *ICRC, P.O. Box 165, Pleasant Valley CT 06063.* SASE required.

INDIANAPOLIS, IN The Indiana Hamfest will open to the public at 8 AM at the Indiana State Fairgrounds Pavilion Bldg. Talk-in on 145.25. For reservations/info, send SASE before Feb. 22 to *Aileen Scales KC9YA, 3142 Market Place, Bloomington IN 47403. Tel. (812) 339-4446.* Sponsored by the Morgan County Repeater Assn.

YORK, PA The 6th annual York Springfest (Ham & Computer) will be held at the York Fairgrounds, starting at 8 AM. ARRL VE Exams. Talk-in on 146.37/.97 and 447.275. Contact *York Springfest, P.O. Box 526, Red Lion PA 17356. Tel. (717) 843-7864.*

MAR 20

MARSHALL, MI The 32nd annual Michigan Crossroads Hamfest, sponsored by the Southern Michigan ARS and the Marshall High Photo/Electronics Club, will be held at Marshall High School from 8 AM-3 PM. Talk-in on 146.66 or 146.52. Get details from *Wes Chaney N8BDM, (616) 979-3433.* For reservations, send SASE to *SMARS, P.O. Box 934, Battle Creek MI 49016.*

WESTBORO, MA The Minuteman Repeater Assn. Flea Market will be held at the Westboro High School. Doors open to the public at 10 AM. Talk-in on 146.61, 449.925, 223.94. Contact *A. Morrison N1BHI, (508) 481-3878.*

MARCH 20-21

FORT WALTON BEACH, FL The Playground ARC will hold their 23rd annual Ham/Swapfest at the Ft. Walton Beach Fairgrounds from 8 AM-5 PM. For tables, call *Jim Jajuga KD4NHQ, (904) 651-5362* or *Freeman Pascal KA0TGN, (904) 581-5610, or (904) 581-4699.* For RV space, call *Stan Reither WD4PEU, (904) 243-8801.* To arrange meetings or reserve commercial space, write to *P.A.R.C., P.O. Box 873, Ft. Walton Beach FL 32549.*

MARCH 21

MONROEVILLE, PA The Two Rivers ARC will hold its 21st annual Hamfest/Computer Fair at the Greater Pittsburgh EXPOMART from 6 AM-3 PM. Contact *Michael A. Kowalcheck, Jr., c/o Two Rivers ARC, P.O. Box 184, Greenock PA 15047.*

NEW CASTLE, DE The NUR Temple, 198 S. DuPont Hwy., (RT 13 near US 40 split), will be the location for the Pen-Del Hamfest, from 8:30 AM-2 PM. Talk-in on 224.220- and 147.225+. For details, please call *(215) 497-2124.* Sponsored by the Penn-Del ARC.

STERLING, IL The Sterling-Rock Falls ARS' 33rd annual Hamfest will be held at the Sterling High School Field House, 1608 4th Ave., from 7:30 AM. Talk-in on 146.25/.85 W9MEP Rptr. Contact *Lloyd Sherman KB9APW, Sterling-Rock Falls ARS, P.O. Box 521, Sterling IL 61081. Tel. (815) 336-2434.*

WEST WINDSOR, NJ The Delaware Valley Radio Assn. will sponsor HAMCOMP '93, their 21st annual Amateur Radio/Computer Flea Market, from 8 AM-2 PM, on the campus of Mercer County Comm. College, Rte. 535 (Old Trenton Rd.). Talk-in on 146.07/.67. Contact *HAMCOMP '93, P.O. Box 7024, West Trenton NJ 08628. Tel. (609) 882-2240.*

YONKERS, NY WECAFEST '93, the Westchester Emergency Comm. Assn's 9th annual Radio/Electronics/Computer Fair, will be held indoors at Yonkers Raceway, intersection of I-87, Central and Yonkers Ave. Doors are open from 9 AM-2 PM. ARRL sanctioned. Talk-in on 147.060 Rptr. For vendor and Tailgate registration, call *(914) 962-9666,* or write to *Tom WB2NHC & Jeanne N2NQY Raffaelli, 544 Manhattan Ave., Thornwood NY 10594.*

MARCH 27

ELIZABETHTOWN, KY The Lincoln Trail ARC will hold their annual Hamfest at the Pritchard Comm. Center, starting at 8 AM. Walk-in VE Exams start at 9 AM. Talk-in on 146.38/.98 and 146.52. Contact *Whitey WD4GDA, P.O. Box 342, Vine Grove KY 40175. Tel. (502) 877-2234.*

MICHIGAN CITY, IN The Michigan City, IN ARC will hold their annual Spring Hamfest/Computer Flea Market at the Rogers High School, Pahs Rd., from 8 AM-2 PM, CST. Free VE Exams. Talk-in on 146.52 MHz simplex and 146.37/.97 (PL 131.8 Hz). Contact *Jack Lemley N6SYJ, 384 Hawthorne St., LaPorte IN 46350. Tel. (219) 325-0951.*

MARCH 28

BRAINTREE, MA The South Shore ARC will hold its annual indoor Flea Market at the Viking Club, 410 Quincy Ave., from 10:30 AM-3 PM. For info, call *Dave, (617) 337-5301, eves. till 11 pm.*

MADISON, OH The Madison High School at Burns and Middle Ridge Rds., will be the location for the 15th annual Hamfest/Computer Show to be hosted by the Lake County ARA. Doors open from 8 AM-3 PM. VE Exams. Talk-in on 147.210+. Contact *Roxanne, Lake County Hamfest, 5777 Fernwood Ct., Mentor on the Lake OH 44060. Phone (216) 257-2036 weekdays from 6 PM-9 PM; weekends 10 AM-4 PM; or (216) 352-6756 weekdays 10 AM-4 PM.*

APRIL 3

PERRY, GA The Central Georgia Nat'l Hamfest will be held at the Georgia Nat'l Fairgrounds. VE Exams. Talk-in on 147.3+. Contact *Central Georgia Nat'l Hamfest, 1412A Russell Pkwy., Suite 210, Warner Robins GA 31088.*

COLUMBUS, IN The Columbus ARC Hamfest will be held from 8 AM-2 PM at Bartholomew County 4-H Fairground's Women's Bldg. on State Rd. 11. Talk-in on 146.790/.190. Contact *Marion Winterberg WD9HTN, 11941 W. Sawmill Rd., Columbus IN 47201. Tel. (812) 342-4670.*

LAWTON, OK The Lawton Ft. Sill ARC will hold their 47th annual LFSARC Hamfest from 8 AM-5 PM at the Comanche County Fairgrounds (in Lawton). ARRL approved. Talk-in on 146.91/.31. Contact *Bob Morford KA5YED, 1415 N.W. 33rd St, Lawton OK 73505. Tel. (405) 355 6120.*

UPPER SADDLE RIVER, NJ The Chestnut Ridge RC will host its annual Flea Market at the Education Bldg., Saddle River Reformed Church, East Saddle River Rd./corner Weiss Rd., from 8:30 AM-2 PM. Talk-in on 146.955 rptr. Contact *Jack Meagher W2EHD, (201) 768-8360.*

APRIL 4

LONGMONT, CO Boulder County Fairgrounds, Hover and Nelson Rds., will be the location for the annual LARCFEST sponsored by the Longmont (CO) ARC. Doors open from 8 AM-3 PM. VE Exams at 1 PM; Contact *(303) 499-1106* for Exam info. Talk-in on 147.27/.87, 146.52. For table info, SASE to *Randy Stevens N0NMD, 5280 Cypress Dr., Boulder CO 80303.*

GROSSE POINTE WOODS, MI The South Eastern Michigan ARA will conduct its 35th annual Hamfest/Swap-N-Shop/Computer Show at Grosse Pointe North High School, 707 Vernier Rd., from 8 AM-2 PM. There will be an ARRL Forum and VE Exams. Talk-in on the SEMARA Rptr. 146.74(-.600). Contact *Rose Ann Mears NV8W, SEMARA Hamfest, P.O. Box 646, St. Clair Shores MI 48080-0646. Tel. (313) 881-3065.*

MADISON, WI The Madison Area Repeater Assn., Inc., will hold its 21st annual Madison Swapfest at the Dane County Exposition Center Forum Bldg. Doors open at 8 AM. Talk-in on M.A.R.A. Rptr. WB9AER, 147.75/.15. Contact *M.A.R.A., P.O. Box 8890, Madison WI 53708-8890,* or call *Jim Waldorf KB9AQQ, (608) 249-7579.* Leave a message on the answering machine.

SPECIAL EVENT STATIONS

MARCH 6-7

DAYTONA BEACH, FL The Daytona Beach ARA will operate K4BV 1700Z Mar. 6-2100Z Mar. 7, from the Oceanfront Bandshell, to celebrate the 52nd Annual Motorcycle Week. Phone operation will be in the lower portion of the General 40, 20 and 15m subbands, with CW operation in the lower portion of the Novice 40m subband. For certificate, send QSL and a 9 x 12 SASE to *DBARA, P.O. Box 9852, Daytona Beach FL 32115.*

MARCH 13-14

ST. PATRICK (SHELBY COUNTY), OH The Farout ARC of Dayton OH will operate WB8SMC/8 from 1700Z Mar. 13-1700Z Mar. 14, to celebrate St. Patrick's Day. Frequencies: 80, 40, 15, 10m Novice CW; 20m General CW; 80, 40, 20, 15m General phone; 10m Novice phone, as band conditions dictate. Send a business size SASE to *Farout ARC, P.O. Box 9181, Dayton OH 45409-9181.*

MARCH 14-15

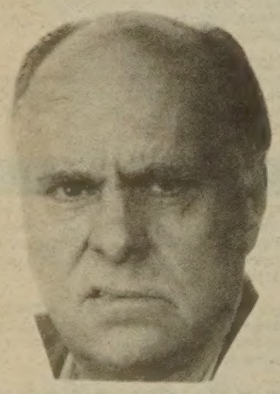
WISCONSIN QSO PARTY Sponsored by the West Allis RAC, from 1800Z Mar. 14-0100Z Mar. 15. CW and phone. Contact *WARAC, P.O. Box 1072, Milwaukee WI 53201.*

MARCH 27-28

VIRGINIA BEACH, VA The Virginia Beach ARC will operate WA4TGF from 1400Z Mar. 27-2000Z Mar. 28, to commemorate the 102nd Anniversary of the *Norwegian Lady.* CW: 10 kHz up from the bottom of the Novice subband; Phone: 3.880, 7.280, 14.280, 21.280, and 28.363. For certificate, send QSL and SASE to *VBARC, P.O. Box 62003, Virginia Beach VA 23462.*

MARCH 28

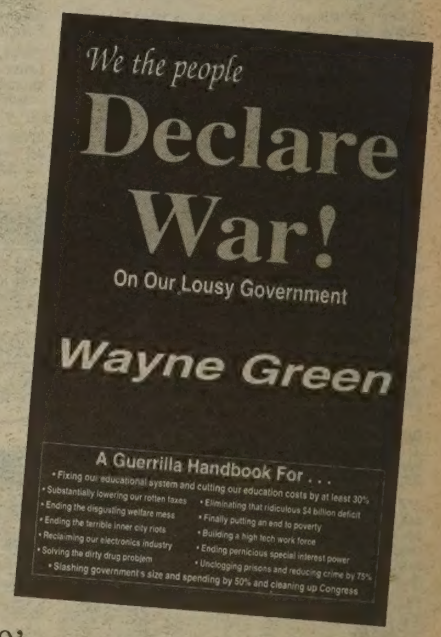
SCHOFIELD BARRACKS, HI Army MARS is sponsoring a Special Event Station to commemorate the 50th Anniversary of the 442nd Regimental Combat Team. Activities are planned for all bands, all modes, including the Novice subbands. Look for us at the lower portion of each subband, 1900Z Mar. 27-1900Z Mar. 28. For a commemorative QSL card, please send your card and an SASE to *Al Shaver, Apt. #608, 84-265 Farrington Hwy., Waianae HI 96792.*



Wayne is mad as hell ...
... and he doesn't want *you* to take it anymore!

Declare War!

On Our Lousy Government


We the people
Declare War!
On Our Lousy Government
Wayne Green
A Guerrilla Handbook For . . .
• Fixing our educational system and cutting our education costs by at least 30%
• Substantially lowering our rotten taxes
• Eliminating that ridiculous $4 billion deficit
• Ending the disgusting welfare mess
• Finally putting an end to poverty
• Ending the terrible inner city riots
• Building a high tech work force
• Reclaiming our electronics industry
• Ending pernicious special interest power
• Solving the dirty drug problem
• Unclogging prisons and reducing crime by 75%
• Slashing government's size and spending by 50% and cleaning up Congress

Fed up with the mess in Washington?
The mess in your state capital?
Poverty, crime, our failing schools?
Wayne Green has solutions. Clever solutions.

Wayne Green's unique reasoning is intriguing – even delightful. Whether you are horrified by his proposals or you embrace them, it is impossible to ignore the basic lesson he presents: It is time to bring logic – not emotions – to bear on America's dilemmas. His spin on America in the 90's helps us to understand how simple the seemingly complex issues are. All it takes is looking at them from an entirely new viewpoint.

Now available in one complete volume, ***Declare War!*** is full of thought provoking ideas and solutions to some of the most difficult problems facing our country today

Regular price: $12.95

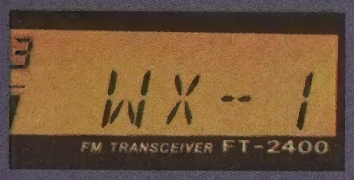
Special For Readers Only–$10.00 (plus $3.50 shipping & handling)

Order Toll-Free: 800-234-8458

FT-2400 Military Spec'd TOUGH

NOTHING COMPARES...

Whether you're roughing it on the tortuous dirt roads of the Baja 1000 or through the big city canyons, the ruggedly designed FT-2400 is built to take the abuse. In fact, the FT-2400 is the first and only amateur radio to be awarded a MIL-STD-810 rating for the shock and vibration. That's why Yaesu is the official radio of the Nissan off-road race teams.



Exceptional features are packed into the FT-2400 such as: ■ **LCD Display**—the largest display available on any 2 meter mobile ■ **Alpha Numeric**—for entering names or callsigns ■ **Backlit DTMF Microphone**—for making autopatch calls safely at night ■ **31 Memories** ■ **Odd Splits**—on any memory channel ■ **3 Selectable Power Level Outputs**—50, 25 and 5 watts or user select ■ **Advance Track Tuning (ATT)**—eliminates big city intermod ■ **Automatic Display Dimmer**—4 levels ■ **FM Modulation**—for true voice clarity ■ **DTMF Selective Paging (optional).**

Other features include: Wideband receiver coverage 140-174 MHz RX, 140-150 MHz TX • CTCSS encode built-in and selectable from the front panel • Five scanning functions: Band Scan, Limited Band Scan, Memory Scan, Memory Channel Lock-out with Selectable Scan Stops and Priority Scans • One piece die-cast construction with extra large heat sink • Automatic Repeater offset • Programmable call channel.

Options: DTMF coded squelch and paging (requires FRC-6 paging unit) • CTCSS Decode Unit (FTS-17A).

If you're serious about affordable communications, you'll want the FT-2400. Contact your Yaesu dealer today.

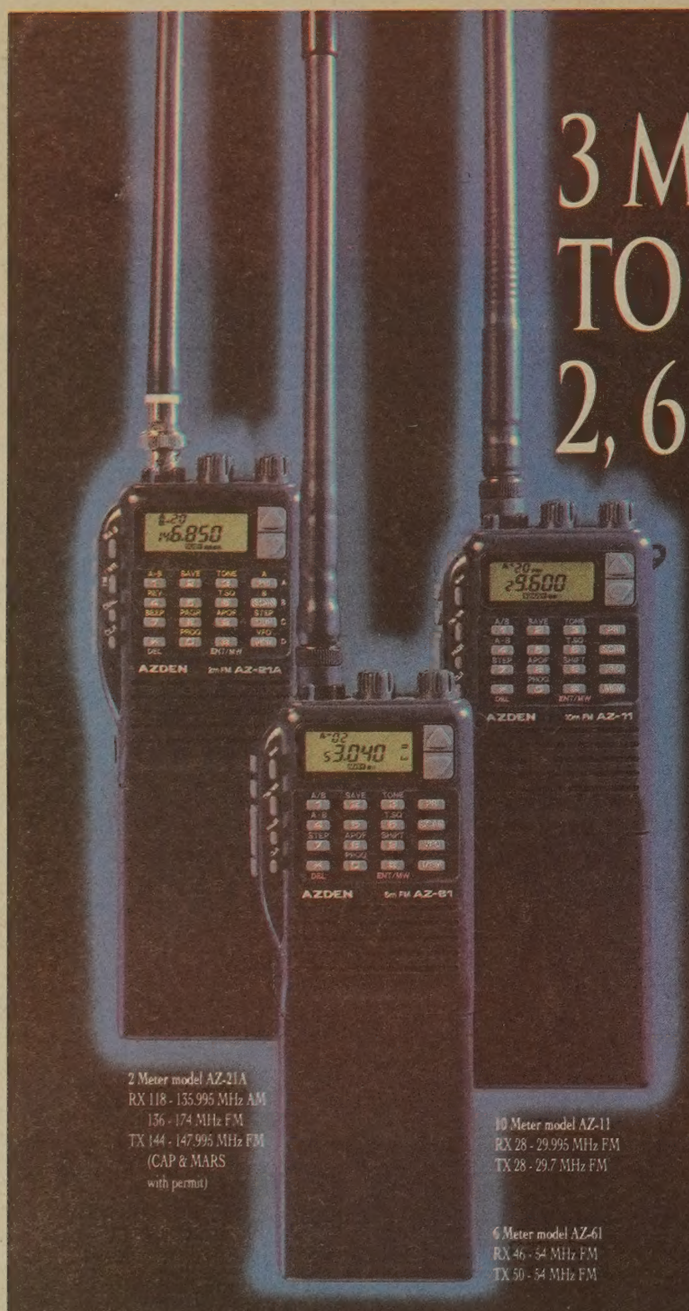
YAESU

Performance without compromise.℠

One-Year Limited Warranty on all Amateur Radio Products.
Specifications subject to change without notice.

Passed MIL-STD-810
Shock and Vibration Test

©1991 Yaesu USA, 17210 Edwards Road, Cerritos, CA 90701



3 MORE REASONS TO BUY AZDEN- 2, 6 & 10 METER HANDHELDS!

Now, for the first time, Azden handhelds are available in the U.S., and you can buy them directly from the factory. This means that you will receive the level of knowledge and expertise that you want when buying a radio. We also have in-house competent technicians, ready to handle your service needs–quickly and efficiently! Don't forget–all Azden radios come with a 2 YEAR LIMITED WARRANTY.

These great new Azden handhelds all feature:

- Rugged commercial construction
- 5 Watts output–standard!
- Includes all functions

Other features include:

- Two level power out (5 and .5 watts)
- True FM modulation
- Double conversion receiver
- Sensitivity <Ø.16 uV for 12 dB SINAD
- Audio output .25 watts
- 41 memories in two banks
- All CTCSS tones (encode & decode)
- DTMF paging & Code Squelch
- 7 DTMF telephone memory Receives aircraft band (AZ-21A only)
- Scan memory skip
- Auto power shut-off
- Battery power saver
- Heavy duty metal heat sink anchors belt clip, antenna, connectors and controls
- Rubberized keys and controls for non-slip performance
- Backlit keypad and display with time delay
- Complete with 12v, 5 watt battery, charger, charger stand, belt clip and hand strap

Accessories:

- Soft carrying case, LC-16
- Weatherproof speaker microphone, SDX-514W
- External DC power cord, AD-16

2 Meter model AZ-21A
RX 118 - 135.995 MHz AM
136 - 174 MHz FM
TX 144 - 147.995 MHz FM
(CAP & MARS with permit)

10 Meter model AZ-11
RX 28 - 29.995 MHz FM
TX 28 - 29.7 MHz FM

6 Meter model AZ-61
RX 46 - 54 MHz FM
TX 50 - 54 MHz FM

"Now Available... 6 & 10 meter 50 watt mobile radios!"

AZDEN®
COMMUNICATIONS DIVISION
147 New Hyde Pk. Rd., Franklin Sq., NY 11010

To Place Orders: 1-800-643-7655
For Technical Assistance: 516-328-7501
Fax Number: 516-328-7506

MasterCard VISA

CIRCLE 92 ON READER SERVICE CARD